SOUTHERN POWER AND INDUSTRY

APRIL, 1950

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SOUTHERN POWER & INDUSTRY is published monthly at 116 E. Crawford St., Dalton, Ga., by W. R. C. Smith Publishing Company, Dalton and Atlanta, Ga., U. S. A. Executive and Editorial Offices, 806 Peachtree St., N.E., Atlanta 5, Ga.
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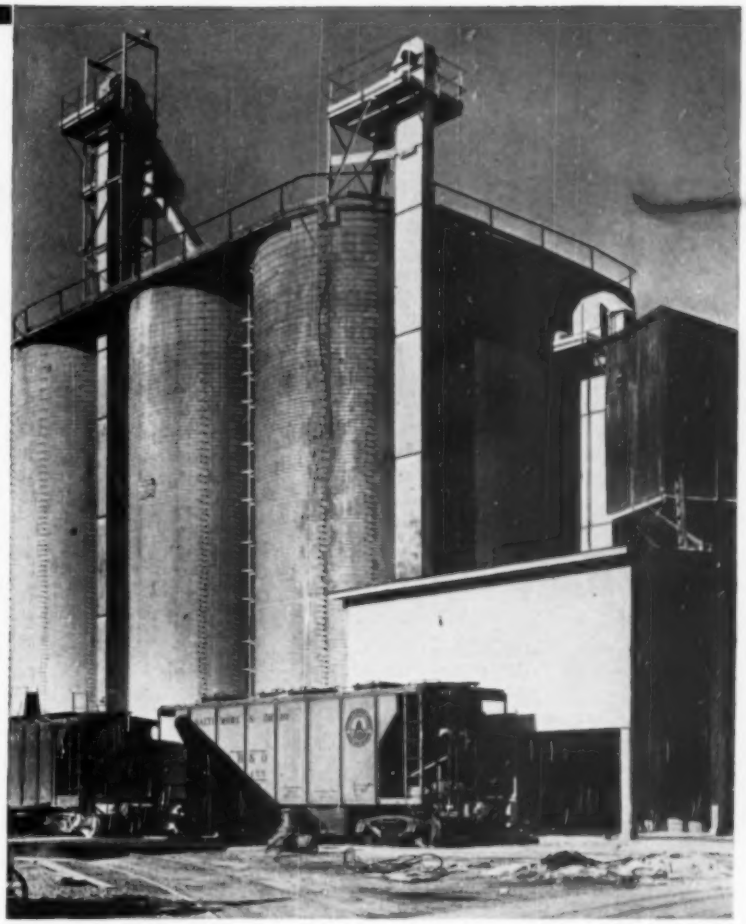
Volume 68 Number 4

JEFFREY BUCKET ELEVATORS

New Improved Design

- Welded Angle Casings —heavy gauge steel Dust tight—Water tight
- Improved Head and Boot Sections
- Increased Bearing Protection
- Removable Hood
- Large Clean-out Doors both sides
- Large Inspection Doors for access to chain and buckets
- Take-ups furnished for Head or Boot if desired—self-aligning, plain or anti-friction bearings



Jeffrey Car Puller is shown in foreground.

These are only some of the features incorporated in our Standard Bucket Elevator line. A type and size to meet any requirement. Complete drawings available. Jeffrey Bucket Elevators are backed by years of engineering experience and hundreds of installations. May we hear from you?

Chains • Conveyors of all kinds • Feeders • Car Pullers • Bin Valves • Dryers and Coolers • Packers • Skip Hoists Screens • Crushers and Pulverizers Belt Idlers • Transmission Machinery Replacement Parts

THE JEFFREY MANUFACTURING COMPANY Established 1877

898 North Fourth St., Columbus 16, Ohio

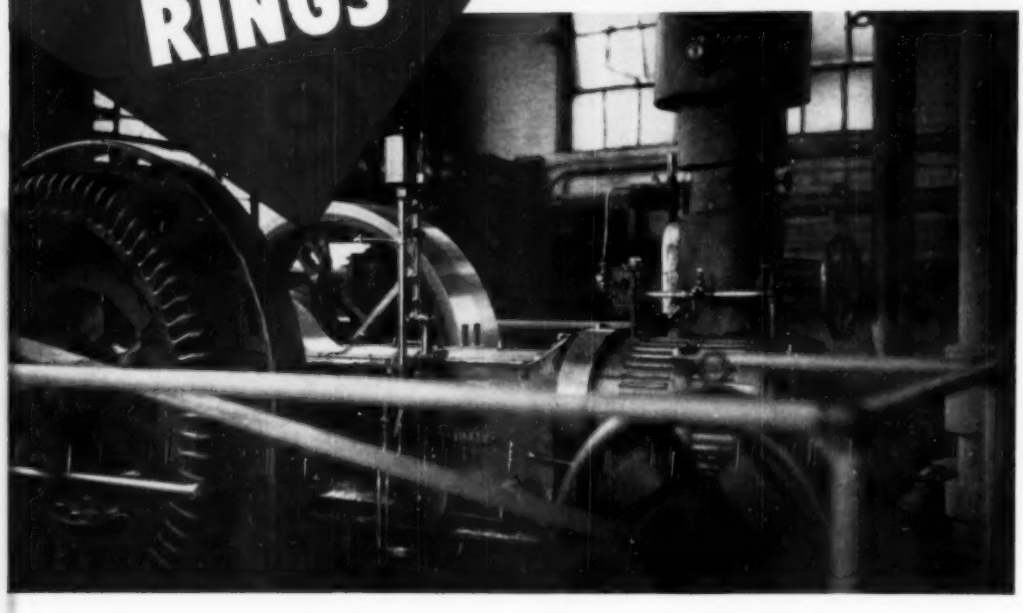
Complete Line of Material Handling, Processing and Mining Equipment

Baltimore 2	Chicago 1	Detroit 13	Jacksonville 2	Pittsburgh 22
Birmingham 3	Cincinnati 2	Harlan	Milwaukee 2	St. Louis 1
Boston 16	Cleveland 13	Houston 2	New York 7	Salt Lake City 1
Buffalo 2	Denver 2	Huntington 19	Philadelphia 3	Scranton 3

Jeffrey Mfg. Co., Ltd., Head Office & Works: Montreal

ASSURE STEAM-TIGHT RINGS

Engines give full power, greater economy with Texaco steam cylinder oils



Texaco makes *a complete line* of steam cylinder oils. This means you can get the one you need to keep engines running smoothly . . . regardless of whether they are oldtimers or mere youngsters in service.

Aside from your special requirements, you will find that all Texaco steam cylinder oils have these basic advantages: they atomize thoroughly and properly . . . cling to cylinder walls to guard against wear and to keep rings steam-tight . . . stop "groans" and reduce maintenance costs.

Let a Texaco Lubrication Engineer recommend the proper Texaco steam cylinder oils to assure best results in your engines. Just call the nearest of the more than 2,000 Texaco Wholesale Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Steam Cylinder Oils

FOR EVERY OPERATING CONDITION

TUNE IN . . . TEXACO STAR THEATER presents MILTON BERLE on television every Tuesday night. Consult your local newspaper for time and station.

SOUTHERN POWER AND INDUSTRY

APRIL 1950

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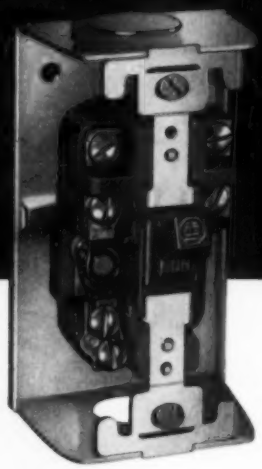
Contents indexed regularly by Engineering Index, Inc.

Editorial and Executive Offices: **SOUTHERN POWER & INDUSTRY, 806 PEACHTREE ST., N. E., ATLANTA 5, GEORGIA**

SAVE 30% to 40% of INSTALLATION TIME

on Starters for Small Motors (1 hp or less)



BULLETIN 600

Manual Starting Switches with Overload Protection

•

No Need to Remove Starter from Enclosure

Installation of the Bulletin 600 Starting Switch is so simple that contractors have saved as much as ten minutes in installation time. In addition, they have found the switch exceptionally reliable.

•

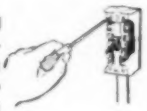
GENEROUS WIRING SPACE
ATTRACTIVE APPEARANCE
SIMPLE DESIGN

STEP 1—REMOVE COVER

Simply remove two screws on the front of the Bulletin 600 Starting Switch and the metal cover slips off, exposing the front and two sides of the switch.

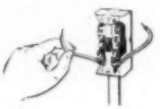
STEP 2—MOUNT UNIT

Mount the switch on the wall with two screws. Conduit openings on top, bottom, and back permit easy connection. No need to remove the starter from the box.



STEP 3—PULL IN WIRES AND CONNECT

Because the compact mechanism allows ample space, wires can be pulled into the box and connected to the terminals without removing the switch from the enclosure.



STEP 4—PUT COVER BACK ON

Finally, with the job completed, the cover is slipped back on, and two screws hold it firmly in place. The entire operation is simple and easy. It saves time and money.

ALLEN-BRADLEY CO.
1328 S. Second Street Milwaukee 4, Wis.

ALLEN-BRADLEY SOLENOID MOTOR CONTROL

CONSULT YOUR LOCAL ALLEN-BRADLEY REPRESENTATIVE

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ST. LOUIS—G. W. Schalchlin, 904 No. Grand Blvd., Tel: Lucas 1901-02
SAN ANTONIO—Glen Mathews, P. O. Box 5121
SAN DIEGO—James A. Setchell, 301 West "G" Street
TULSA—John W. Elder, 310 Thompson Bldg., Tel: 3-0950

Facts and Trends

FOR SOUTHERN INDUSTRIAL AND POWER EXECUTIVES

April, 1950

A PRESSURIZED FURNACE operating at 8.3-in. water gauge is an unusual feature of the new Knox Lee Power Plant of the SOUTHWESTERN GAS AND ELECTRIC COMPANY. The 300,000 lb/hr outdoor type Babcock & Wilcox unit departs from conventional design.

No induced draft fan is required and only one forced draft fan is used. Special care was taken in the design to reduce gas leakage through the setting to a minimum. ADVANTAGES expected are: lower excess air with consequent higher boiler efficiency; a 300 hp reduction in power requirements by elimination of the induced draft fan; and simplification of duct and stack arrangement. The installation is featured in this issue of SOUTHERN POWER & INDUSTRY.

PLANT SHUT-DOWNS are in the offing for vacation closings. Consequently, everything possible should be done to eliminate sources of fire and to keep fire protective equipment ready for immediate action. The June issue of SP&I will list those items requiring attention before a plant is closed for vacation and will outline precautions needed during the shut-down. The article will point out what to do about housekeeping, waste disposal, and flammable liquids and gases. It will show what part of the electric power, steam power, and heating should be kept in service and will include specific suggestions for maintaining watch service and checking the protective equipment.

AGRICULTURAL MACHINERY AND EQUIPMENT made by Southern manufacturers, who use Atlantic Steel Company's prime materials or processed parts, will be spotlighted at the Atlantic Steel Company's "DIXISTEEL ON DIXIE FARMS" Open House, May 5 - 6th in Atlanta, Georgia. In addition to the mechanized exhibits, plant engineers are invited to attend extensive plant tours through the open hearth, soaking pits, blooming mill, bar mill, strip mills, wire and nail mills, galvanizing department, and forge shop.

USE OF INFRARED OVENS in place of VAPOR DEGREASERS for cleaning sheet metal parts is reported by several metal-working plants. Typical operation is the degreasing of 31-in. x 20-in. conveyorized parts in 36 seconds between two banks of nine 3.6 kw Chromolox radiant heaters. Heated section of oven is approximately 3 ft long and conveyor speed 5 fpm. Reduced labor costs, greater efficiency and more uniform degreasing are reported.

PERCUSSION WELDING DEVELOPMENTS now make it possible to flash weld aluminum tubing directly to copper, stainless steel, Monel, etc., without regard to the dissimilar metals in the joint. Charles Bruno, Reynolds Metals Co. welding specialist from Louisville demonstrated the improved flash welding development last month at the Atlanta, Georgia plant of the Southern States Iron Roofing Company, distributors for Reynolds products.

New techniques reduce the fusion zone in the weld to less than one thousandth of an inch in width. Practically no intermixing of elements occurs. Thus, high-strength aluminum alloys can now be heat treated at the mill and weld-fabricated by the user without materially reducing the mechanical properties of the high-strength, heat-treated aluminum. This eliminates the former problem of how to heat treat large or complicated welded assemblies.

NEW RAPID METHOD FOR TOTAL HARDNESS DETERMINATION IN WATER is announced by the ELGIN SOFTENER CORPORATION in this issue of SOUTHERN POWER & INDUSTRY. In use for the past year in Elgin laboratories, the VERSENATE method for determining the calcium magnesium and total hardness content of water is claimed to be faster and more accurate than the conventional soap method and is as simple to run as is an alkalinity titration.

NEW SELF CLOSING DRUM COVERS convert 30 to 55 gal used steel drums into fireproof containers. A fusible link in the detachable PROTECTOSEAL drum cover melts at 160 F, releasing a spring loaded plunger which closes the cover tightly. Cover can be quickly removed for easy cleaning, washing, or burning-out of drum.

REYNOLDS METALS COMPANY'S JONES MILLS (ARKANSAS) aluminum reduction plant, with an annual capacity of 144,000,000 lb of aluminum, is now in capacity operation for the first time since the war. The plant includes 68 large engine-generator sets capable of supplying 78,000 kw of electric power, which is sufficient to operate only two of the four pot lines. Additional electric power for the two other lines is now available from the new Lake Catherine plant of the Arkansas Power & Light Company.

THE RELATION BETWEEN THE DIESEL ENGINE and its lubrication oil is one of paradoxes. The engine wants the oil to stay clean, yet it makes it dirty; it wants the oil to stay cool, yet it makes it hot; it wants the oil to be "slippery", yet makes it gritty; it wants to use oil, yet the plant engineer wants to save it. See "Prescription Lubrication" in this issue.

AGGRESSIVE SALESMANSHIP ON THE PART OF ELECTRIC UTILITIES is needed to meet the growing reserves in power producing capacity, according to C. H. Lang of G-E's Apparatus Department. The power shortage "spook" which has been hovering over the electrical industry for the past five years never really materialized. Instead, the utility companies need more load for their expanded capacity which can be secured only through increased salesmanship.

The electrical industry has the capacity to produce, has the sales tools available to sell this capacity, and the price is right. Mr. Lang emphasizes that the kilowatt hour represents the greatest bargain in the American market today.

THE MAY MAINTENANCE ISSUE OF SP&I will be made up entirely of direct on-the-job solutions of current maintenance problems described by Southern and Southwestern engineers and executives from actual plant experience. Maintenance ideas and developments will cover piping and valves, buildings and equipment, materials handling, electrical and mechanical maintenance, transmission and lubrication, etc.

THE MORE POWER TO AMERICA SPECIAL, "first train of its kind in industrial history," will be launched on a nationwide tour by General Electric's Apparatus Department for the inspection of utility and industrial executives. More than 2,000 electrical products, processes and techniques will be displayed. Train, to be hauled by an Alco-G-E two unit, 4,000 hp diesel-electric locomotive, will display the latest advances in power generation and methods and equipment for the profitable use of electricity throughout all industry. Schedule for Southern and Southwestern industrial centers will be noted in an early issue of SP&I.

USE OF RADIOACTIVE ISOTOPES has several reported advantages over previous methods of using salts and dyes for measuring horizontal mixing in various water and sewage treatment processes. An A.S.C.E. paper notes that radiosotopes can be detected in extremely small concentrations; can be easily identified by many types of modern Geiger counters which give precise results; tracer clouds can be detected through conduit walls, eliminating the necessity of sampling the flow; and temperature changes have no effect. DISADVANTAGES involved are that great care is required to protect personnel and though the cost is usually quite reasonable in some instances the expense runs high when the energy is dissipated during long shipping delays.

Write the editors for additional information on any of the above items.
SOUTHERN POWER & INDUSTRY 806 Peachtree St., N.E. Atlanta 5, Ga.

Hooking them up

can cost you less!

Unless your feeders have been figured in *aluminum*, they haven't been figured *low*. Get prices both ways—aluminum and copper. The savings possible with aluminum may surprise you.

For prices, call one of the manufacturers listed below.

For copy of "Questions & Answers About Insulated Aluminum Conductors", call your nearby Alcoa Sales Office, or write ALUMINUM COMPANY OF AMERICA, 1780D Gulf Building, Pittsburgh 19, Penna.

Insulated Aluminum Conductors

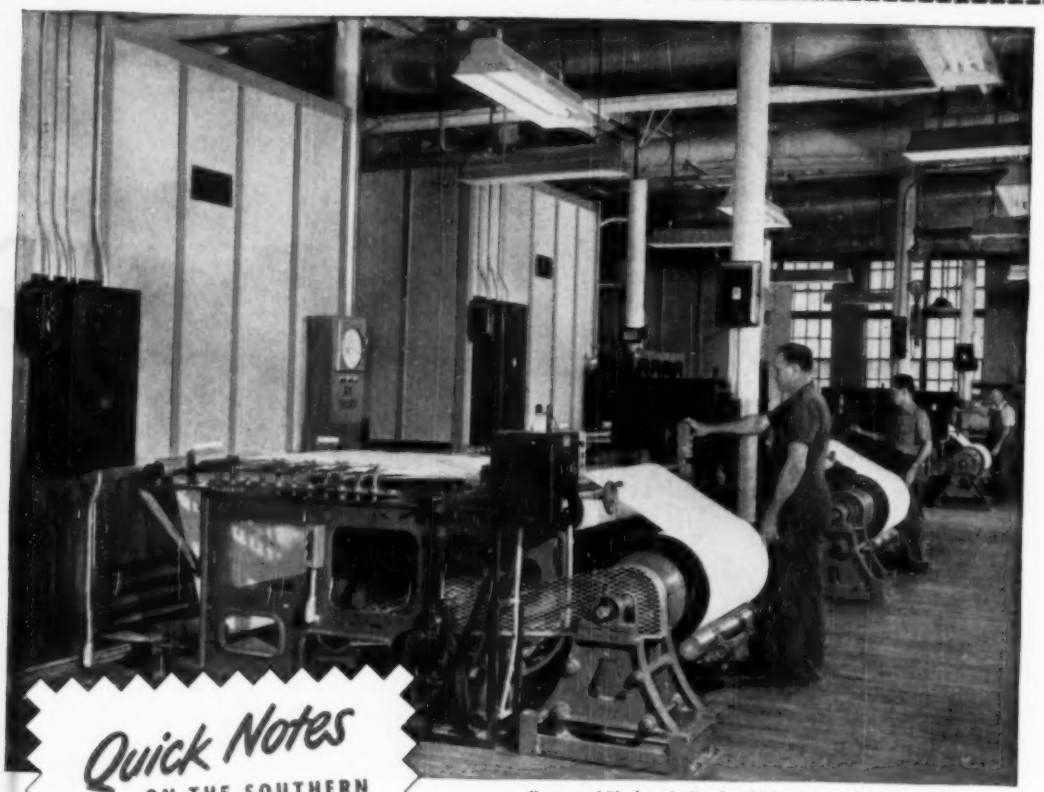
ALCOA ALUMINUM

of ALCOA EC ALUMINUM are made by

- Anaconda Wire & Cable Company
- Collyer Insulated Wire Company
- Crescent Insulated Wire & Cable Company
- General Cable Corporation
- The Okonite Company
- United States Rubber Company

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



Battery of Slashers in Borden Mills plant at Kingsport, Tenn.

Quick Notes
ON THE SOUTHERN TEXTILE INDUSTRY

- Dollar volume quadrupled in the last ten years
- Twenty percent more mills in operation since 1939
- Second ranking southern industry in product value
- Mills employ every fifth southern manufacturing worker.

BIG NEWS IN TEXTILES

Progressive southern mills now weave better cloth faster, thanks to Slashers equipped with a revolutionary Westinghouse Drive. Basic secret—precise tension control.

Slashing comes just before weaving. Warp yarn is pulled through a bath of starch "sizing" to make it stiff for the loom. But too much pull in the Slasher weakens the yarn. This often happens when Slashers have mechanical "friction" drives. When the yarn is put on the loom, threads break and the loom must be stopped. Costs go up and the resultant cloth is not uniform.

Westinghouse licked the problem with an all-electric Slasher Drive that makes overstretching practically impossible. Net result—better cottons, rayons, worsteds for the customers, lower costs for mill operators.

The engineering talent that developed this significant money saver is available to you. When you want help on *any* electrical problem, get in touch with your Westinghouse office.

Why is the SOUTH growing faster than the rest of the U. S.?

Figure it on the basis of electric power output, a good yardstick of industrial growth. In the last ten years, kwhr production in the U. S. has increased 120%. *In the South, it's up 164%.* This means growth—more plants, more production, more income. Sample—since 1939 the dollar volume of manufactured goods in the South has jumped 277%!

What's the reason for this growth? Many things—abundant raw materials, high-grade labor supply, low-cost power, good markets. Established industries are expanding, new industries see the advantages and move in.

Westinghouse recognized the advantages a long time ago. Early in our development we built manufacturing plants in the South. These plants now employ some 4,000 people. They use raw materials from southern mines, mills, farms and forests — as do our factories elsewhere.

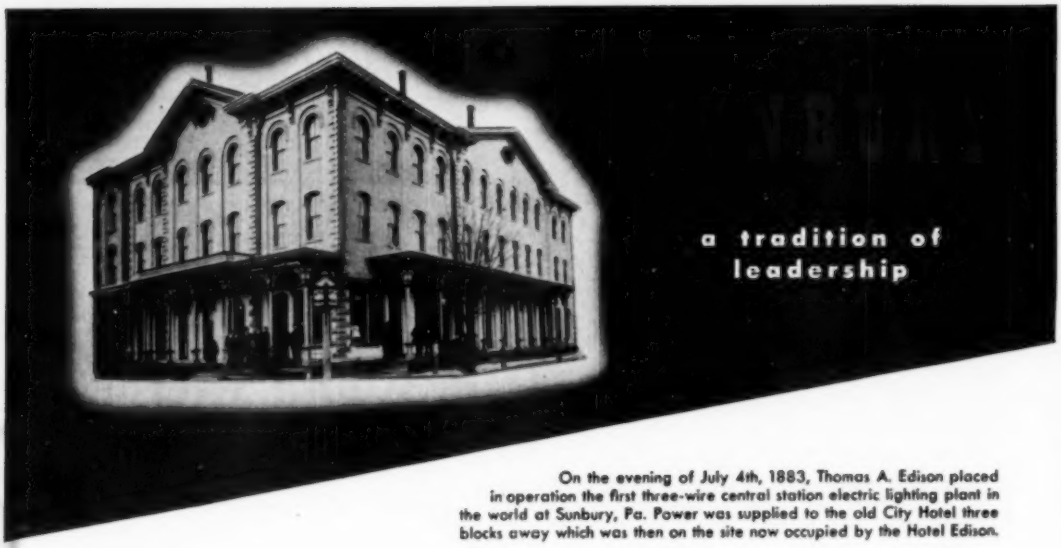
Our partnership with the South has worked both ways. A large part of the power generating apparatus needed for industrialization was supplied by Westinghouse. Through technical developments, such as the textile Slasher Drive on the opposite page, we have helped southern industries make goods better and cheaper.

As an organization with deep roots in southern soil, we have a basic stake in its future. Our job is to serve you. When you have problems in the development or use of electricity, contact your Westinghouse office.

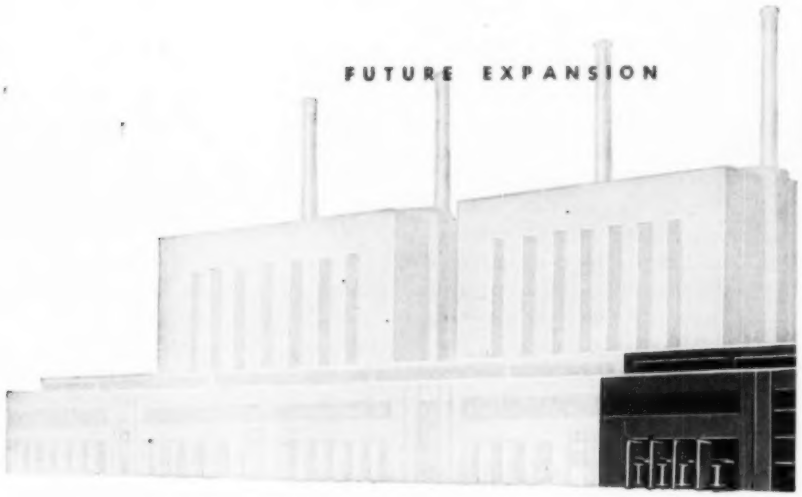
J-94825

Westinghouse

A BASIC PART OF THE SOUTH



On the evening of July 4th, 1883, Thomas A. Edison placed in operation the first three-wire central station electric lighting plant in the world at Sunbury, Pa. Power was supplied to the old City Hotel three blocks away which was then on the site now occupied by the Hotel Edison.



The world's largest power plant using pulverized anthracite has been completed recently on a site near Shamokin Dam along the Susquehanna River about two miles below Sunbury, Pa. This 150,000 kw installation, first of a number planned for the site, is part of the Pennsylvania Power & Light Company's network serving 28 counties which cover an area of 9,500 sq miles in central eastern Pennsylvania.

The two 75,000 kw turbine generators are served by four 130-ft high Foster Wheeler Steam Generators, the largest ever built for direct firing of pulverized anthracite.

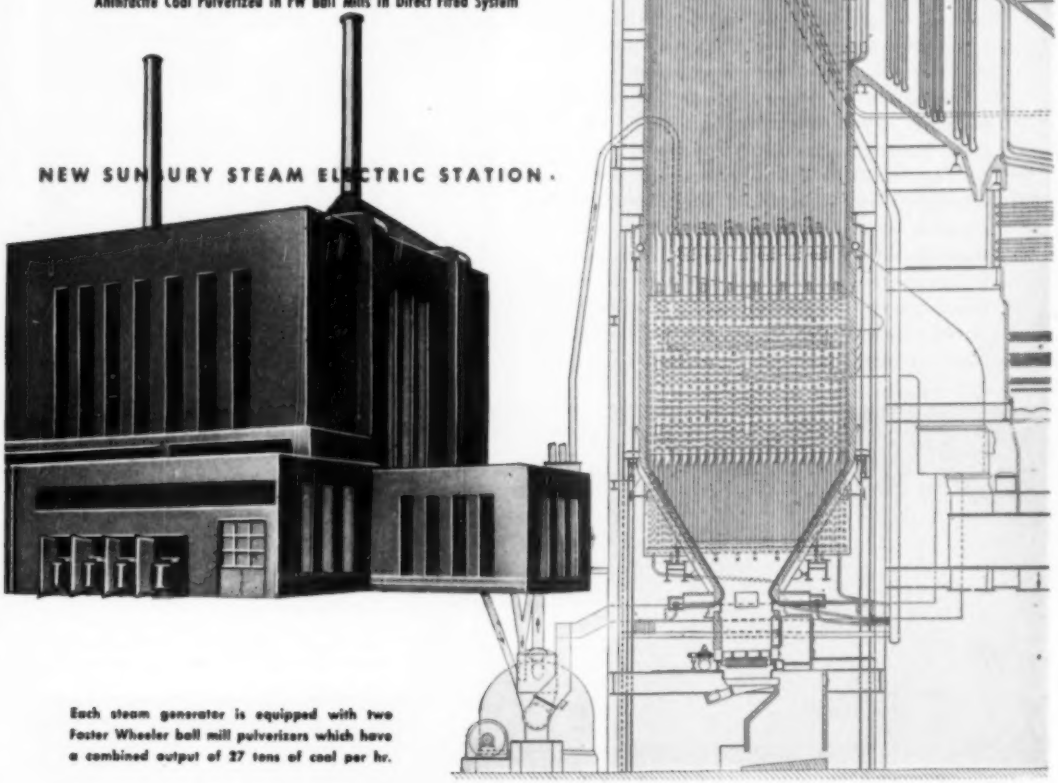
An extension of 100,000 kw capacity, now under construction, will be completed in 1951 and equipped with Foster Wheeler Steam Generators.

FOSTER WHEELER CORPORATION • 165 BROADWAY

Four FOSTER WHEELER Units for Sunbury Steam Electric Station of the PENNSYLVANIA POWER & LIGHT COMPANY

Capacity	400,000 lb per hr
Superheat Control Range	250,000 to 400,000
Pressure Superheater Outlet	1350 psig
Final steam Temperature	955 F

Anthracite Coal Pulverized in FW Ball Mills in Direct Fired System



Each steam generator is equipped with two Foster Wheeler ball mill pulverizers which have a combined output of 27 tons of coal per hr.

NEW YORK 6, N. Y.

THE DIAMOND "UTILISCOPE"

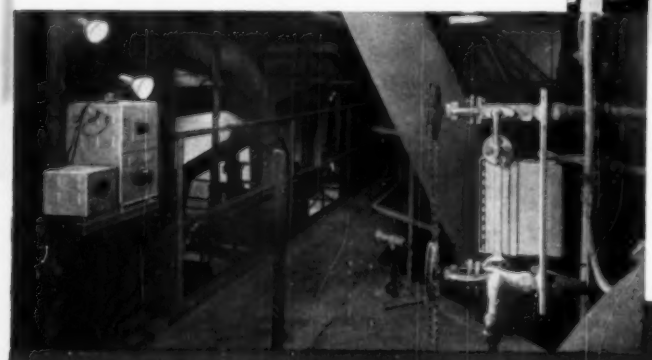
(WIRED TELEVISION)

Brings Boiler Water Level to the Control Panel

there can be no mistake

Regardless of the obstructions and the distance between boiler water level gauge and control panel, the Diamond "Utiliscope" brings an exact instantaneous and continuous picture of the water level to the operator in the control room. There can be no mistake because the "Utiliscope" shows either the correct reading or there is no image.

The continuous picture produced by 60 image fields per second (sound motion pictures have 48) shows *instantly* any change in water level . . . there is no measurable time lag. Among the other advantages of the "Utiliscope" are: sharp contrast, simplicity of design, rugged construction, easy installation, exceptional stability and simple control. It has numerous additional uses such as remote observation of stack discharge, combustion in furnaces, destructive testing, etc. Ask for Bulletin 1025 which will suggest many other applications.



(Above) The "Utiliscope" screen is readily incorporated into the control panel where it is most convenient and always before the operator.

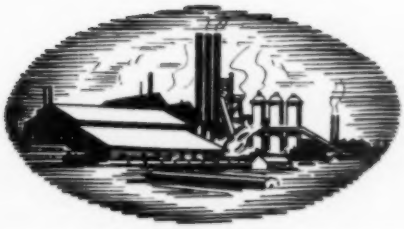
(At left) The "Utiliscope" camera is permanently focused upon the boiler water gauge. It sees and instantly transmits every variation in water level . . . its attention never wanders.

The "Utiliscope" is a product of the Capehart-Farnsworth Corporation and the Diamond Power Specialty Corp.

DIAMOND POWER SPECIALTY CORP.

LANCASTER, OHIO

Diamond Specialty Limited, Windsor, Ontario



1900 ★ THE MIRACLE OF AMERICA ★ 1950

Freedom and Progress

It's no stretch of the imagination, rather, robust realism to call our past half century a Miracle—U. S. A.

America has set an amazing record of progress in 50 years—but a moment in the history of civilization. A record unequalled by any other political or economic system.

Merely by broad brush strokes, we can all visualize this miracle. Remember the crystal set, the hand-cranked car, the biplane? A far cry from our FM radio, television, hydro-matic drive and supersonic planes.

And here's another phase of the miracle that went hand-in-hand with these and the myriad of intertwined technological advances—ranging from the radio telephone and Bakelite to the X-ray tube and teletype . . . and to atomic energy and its untold potentialities.

- Since 1900 we have increased our supply of machine power 4½ times.
- Since 1900 we have more than doubled the output each of us produces for every hour we work.
- Since 1900 we have increased our annual income from less than $2400 per household to about $4000 (in dollars of the same purchasing power), yet . . .
- Since 1900 we have cut 18 hours from our average work week—equivalent to two present average workdays.

How did we do it? The basic cause for this composite miracle has been the release of human energy through FREEDOM, COMPETITION and OPPORTUNITY. And one of the most important results is the fact that more people are able to enjoy the products of this free energy than in any other system the world has ever known.

THIS IS THE MIRACLE OF AMERICA . . . it's only beginning to unfold.

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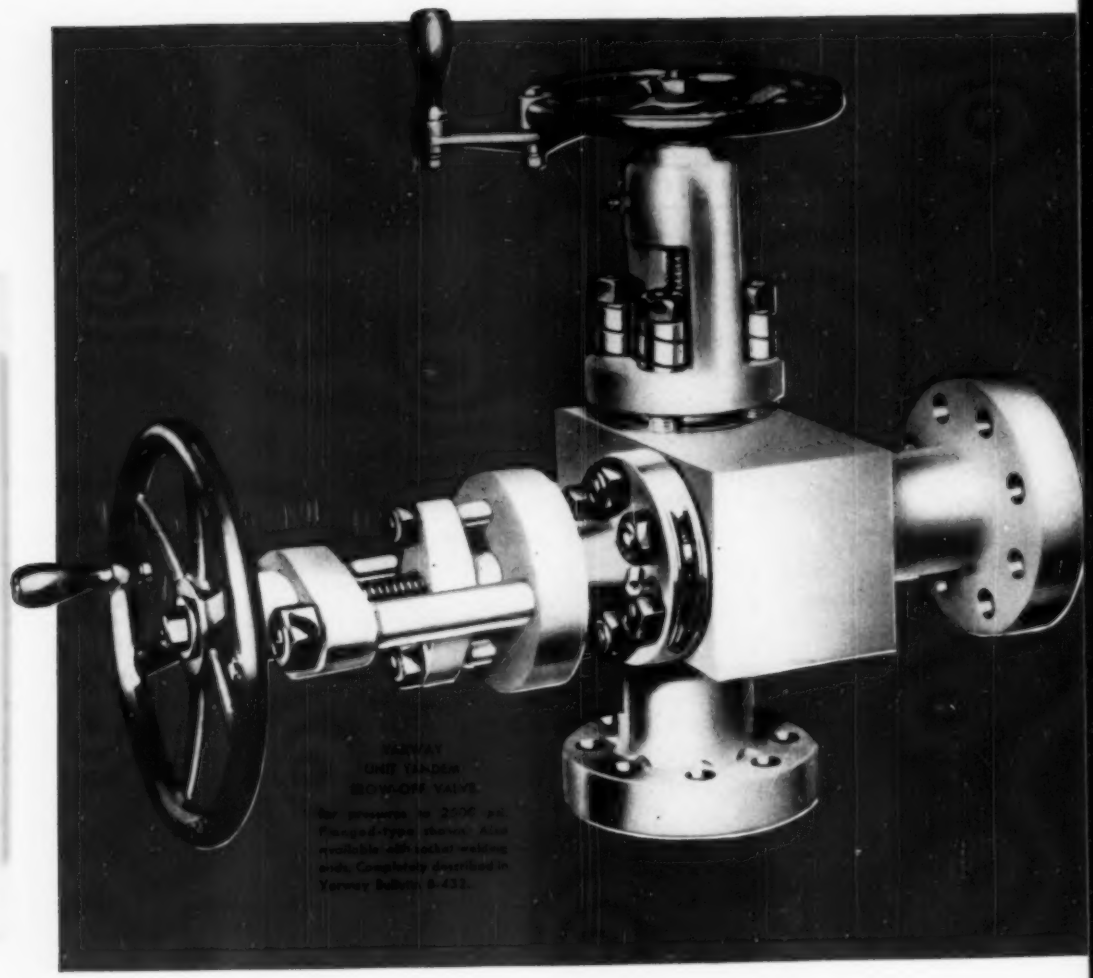
SOUTHERN POWER & INDUSTRY

YOUR BOILER



YARWAY

IS WORTH A *GOOD* BLOW-OFF VALVE

Boilers represent sizable investments . . . certainly worth protecting with the most dependable boiler trim you can get.

You need good blow-off valves—valves that keep blow-down lines tight, don't wear, clog or leak, and are rugged enough to stand up under the severe shock of regular or emergency blowing-down under pressure.

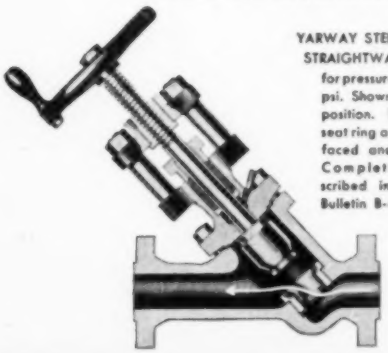
Yarway Blow-Off Valves meet those requirements. Both Yarway Seatless Valves with balanced sliding plunger, and Yarway Stellite-faced Hard-Seat Valves embody the most recent developments in design and metallurgy.

Engineers tell us the sturdiest of all blow-off valves is the Yarway Unit Tandem. This famous valve combines either a seatless and hard-seat, or two hard-seat valves, in a one-piece forged steel body. It is made for pressures up to 2500 psi. Other Yarway Blow-Off Valves meet lower pressure requirements.

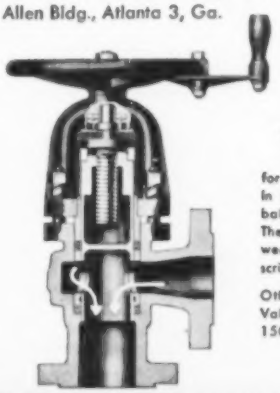
It is significant that more than 15,000 plants throughout the world use Yarway Blow-Off Valves . . . and among the higher pressure plants, 4 out of every 5 are Yarway-equipped!

A Yarway bulletin will tell you in detail how these valves can protect *your* boiler investment. Write today, stating pressure range.

YARNALL-WARING COMPANY, *Home Office:* 116 Mermaid Ave., Phila. 18, Pa.
Southern Rep.: ROGER A. MARTIN, Bona Allen Bldg., Atlanta 3, Ga.



YARWAY STELLITE-SEAT STRAIGHTWAY VALVE for pressures to 2500 psi. Shown in open position. Disc and seat ring are stellite-faced and ground. Completely described in Yarway Bulletin B-432.



YARWAY TYPE "B" SEATLESS ANGLE VALVE for pressures to 400 psi. In open position. Notice balanced sliding plunger. There is no seat to score, wear, clog or leak. Described in Bulletin B-424.

Other Yarway Seatless Valves for pressures to 1500 psi.

WHERE TO GET IT *And How to Do It*

—INDEX OF HELPFUL BOOKLETS, BULLETINS, REFERENCE LITERATURE—

Cooperating with leading manufacturers of equipment and supplies, SPI makes available for the asking without cost or obligation, the following valuable bulletins, booklets, handbooks and catalogs.

Check the list, fill in Coupon, mail to SOUTHERN POWER & INDUSTRY. (Coupon Post Cards on page 17 and 18.) This service restricted to those interested in the operation or design of Industrial, Power and Service Plants.

STEAM PLANT . . . FURNACES, BOILERS, STOKERS, BURNERS

14 OIL BURNERS — Bulletin 24 — Describes the SAL steam atomizing oil burner, a large capacity unit with great flexibility of performance. Fewer burners with higher performance. — NATIONAL AIROIL MFG. CO., INC.

19 COAL CRUSHERS—Bulletin, "Crushing Coal at Less Than One Cent Per Ton"—Illustrates and describes design, operation and application of American ring crushers—and analyzes the sizing of coal and its relation to ashpit losses.—AMERICAN PULVERIZER COMPANY.

27 PACKAGED STEAM GENERATORS—Catalog 211—Describes and illustrates features of construction which contribute to the high efficiency of Superior steam generators. Gives details of capacity, dimensions, operating data. — SUPERIOR COMBUSTION INDUSTRIES, INC.

31 SPREADER STOKER—Bulletin B-7 describes the long successful Chicago automatic spreader stoker, now manufactured by Standard at Erie, and backed by experience in designing and building over 20,000 units—excellent fuel distribution, ash disposal, feeding, air proportioning and turbulence. — THE STANDARD STOKER CO., INC.

33 FURNACE AND BOILER SETTINGS — Catalog, 40 pages, describes Abco furnace and boiler settings in Southern and Southwestern industrial and utility plants—many designed to convert waste materials into low-cost steam. Suspended arches and supporting walls.—ABCO FURNACE DIVISION, ACME BRICK CO.

47 SPREADER STOKERS—Bulletin SB-31 gives complete details on the design, application and operation of spreader stokers which burn a wide range of coals efficiently and economically, and results from over 100 years of steam generating equipment manufacture.—ERIE CITY IRON WORKS.

60 COAL HANDLING EQUIPMENT — Data sheets describe a simplex loader for skip buckets, a bucket elevator for elevating coal vertically or on an incline—skip hoists for handling bulk material in any type, size or shape, dry or wet—a cable drag scraper, designed to easily and effectively handle coal.—BEAUMONT BIRCH CO.

78 WELDED BOILERS—Bulletin S-67—Describes electric welded boilers featuring three-pass gas travel, large liberating area and combustion chamber, tapered water legs, double section grate—1800 to 44,000 sq ft. for coal, oil or gas firing.—THE BROWNELL CO.

90 STEAM BOILERS—Catalog, 12 pages, describes oil and gas fired steam boilers for processing and heating, in sizes from 15 to 500 horsepower, and 15 to 200 psi. Diagrammatic cross-section illustrations show four pass design.—CLEAVER-BROOKS CO.

FANS, PUMPS, COMPRESSORS, HEATERS, HEAT TRANSFER

104 LEVER-SEALED PLUG VALVES—Valve Reference Book No. 38—Describes how Homestead "Lever-Seald" valves, due to powerful lever and screw device, eliminates valve failures due to corrosion, temperature and pressure. — HOMESTEAD VALVE MFG. CO.

117 EXHAUST FANS— Bulletin 484 — Describes how exhaust fans, direct driven and belt driven, cut fatigue loss in factory and office, and increase production.—THE EMERSON ELECTRIC MFG. CO.

120 CONTINUOUS BLOW-OFF SYSTEM —Publication 4081—The savings possible through continuous blow-off as applied in many modern boiler plants.—COCHRANE CORP.

122 FANS—Catalog—Gives details of a wide variety of air handling equipment for use in industrial, power and large service plants to give mechanical draft, space heating and air conditioning, and to perform various blowing and suction functions in process plants.—CLARAGE FAN CO.

130 BOILER FEED PUMPS — Bulletin 109—Gives complete details and application data on a wide variety of precision-built boiler feed pumps, with capacity from 100 to 2700 gpm and pressures up to 3000 psi—both split case and barrel types. Particularly helpful are charts determining vapor pressure and density of water at temperatures up to 550° F, etc.—PACIFIC PUMPS, INC.

149 VENTILATING FANS—Bulletin Series 700 covers heavy-duty fans for all kinds of industrial ventilating service, meeting tough assignments capably and efficiently. High velocity axial flow air movement, sizes to 60 inches.—Propellair Div., ROBBINS & MYERS, INC.

150 INDUSTRIAL PUMPS — Bulletin 49-6600, 8 pages—Describes the line of VMT pumps designed for handling all types of liquids, hot or cold, corrosive or non-corrosive — where net positive suction head is limited.—BYRON JACKSON CO., PUMP DIVISION.

184 UNIT HEATERS — Catalog 12-C-1 — Gives complete working data on down-blow unit heaters, particularly intended for high installations ranging 15 to 45 ft above working zone, and other spot locations as described.—FEDDERS-QUIGAN CORP.

INSTRUMENTS, METERS, CONTROLS, REGULATORS

201 FLOWMATIC FEEDWATER REGULATOR — Bulletin 429-B—Describes the theory, application and accomplishments of the Copes Flomatic regulator, gives engineering data regarding performance and application.—NORTHERN EQUIPMENT CO.

207 PRESSURE REDUCING VALVES—Catalog 72—Gives complete information on Mason No. 11 reducing valves to provide accurate, dependable pressure control under all normal conditions.—MASON-NEILAN REGULATOR CO.

209 CONTROL VALVES — Condensed Catalog A50, 70 pages, describes automatic pressure, flow and liquid level controls for steam, air, water, gas, oil and other fluids, and vapors. Price lists, dimension tables, illustrations.—DAVIS REGULATOR CO.

213 BOILER METERS—Bulletin 46-A—Explains the application and operation of Bailey Boiler Meters and shows the savings in fuel and maintenance gained through their use.—BAILEY METER CO.

227 INSTRUMENT PANELS — Bulletin 126—Describes the last word in modern instrumentation and in fine panel assembly suitable to industrial and utility plant applications.—FALSTROM CO.

232 TEMPERATURE LIMITING REGULATORS — Bulletin—Describes snap action temperature limiting regulators which shut off the steam supply when the exact temperature limit has been met. Valuable in pasteurizing and other food processes.—MANNING, MAXWELL & MOORE, INC.

238 SWITCH CONTROLS — Catalog No. 600-A — Gives complete information regarding a broad line of dependable controls for various industrial requirements as well as suggested applications.—THE MERCOID CORP.

240 HUMIDITY CONTROL — Bulletin 302—Describes the new Type 190 Hygrostat which gives accurate humidity control—pneumatically operated and sensitive to the slightest changes.—POWERS REGULATOR CO.

256 PILOT REGULATING VALVES — Bulletin 47-1, 24 pages, describes single seat pilot balanced regulating valves in four general classes, slip stem and rotary shaft for steam, air and gas—slip stem and rotary shaft for liquids—engineering data and application information.—BELFIELD VALVE DIV., MINNEAPOLIS-HONEYWELL REGULATOR CO.

264 FEEDWATER CONTROL — Bulletin S-20-E — Describes differential level and impulse control of boiler feedwater level under conditions of quick load change and surging feedwater.—THE SWARTWOUT CO.

284 WATER GAGES — Bulletin C — Describes split-gland adjustable watergages, simple and easy to install without wrenches or tools, of superior quality and applicability.—ERNST WATER COLUMN & GAGE CO.

285 INSTRUMENT AND CONTROL PANELS—Bulletin 773 gives complete information on the manufacture and distinguishing features of Hays custom-built panels, with photos of typical installations in leading industrial plants throughout this country.—THE HAYS CORP.

287 NON-SEGREGATING COAL DISTRIBUTORS — Bulletin 1349—Illustrates and describes the operation and construction of Richardson Monorate non-segregating coal distributors for feeding stokers with even distribution of coal.—RICHARDSON SCALE CO.

291 FLOW CONTROL VALVES—Bulletin 242-1 describes high precision in hand control of flow through the use of the Belfield high lift hand control valve with micrometer indication. Complete engineering details of application and operation.—Belfield Valve Div., MINNEAPOLIS-HONEYWELL REGULATOR CO.

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316 TANKS AND VESSELS — Bulletin describes the facilities and products developed through sixty years of manufacture and erection of steel tanks and pressure vessels, smoke stacks, breechings, boilers, and the like for Southern industry.—J. J. PINNIGAN CO., INC.

325 TOOLS FOR CONSTRUCTION—Catalog 49-G gives complete listings, specifications and applications for Skil saws, drills, sanders and other tools used in construction, and the accessories for such tools.—SKILSAW, INC.

331 FABRICATION OF STAINLESS AND ALLOY STEEL—Bulletin describes the fabrication, design and engineering of stainless steels, alloy steels and non-ferrous materials in the production of process and tank equipment, designed to resist corrosion and contamination.—GRAVER TANK & MFG. CO., INC.

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367 INDUSTRIAL HEATING — Catalog 50, 50 pages—Gives data on the type and size of electric heating units and similar equipment for industrial heating needs. Detailed diagrams and photographs describe applications. — EDWIN L. WIEGAND CO.

PIPING, VALVES, FITTINGS, STEAM SPECIALTIES, TRAPS

406 BLOW-OFF VALVES FOR BOILERS —Bulletin B-434, for pressure up to 400 lb.and Bulletin B-424, for pressures from 400 to 2500 lbs—Describe the construction, details, dimensions, prices, applications, etc., of Yarway seatless, double-tightening and hard-seat blow-off valves in various iron-alloy combinations. — YARNALL-WARING COMPANY.

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449 REDUCING VALVES — "Atlas Reducing Valve Data Book" — Gives complete information on Type "D" reducing valves of simple design, easy to inspect, adaptable, durable.—ATLAS VALVE CO.

450 FLOAT AND THERMOSTATIC STEAM TRAPS — Bulletin 450—Describes the Sarco line of float and thermostatic steam traps, compressed air traps and liquid level controls. Dimensions, capacities, other engineering and economics data.—SARCO CO., INC.

458 STEAM TRAPS — Catalog 448 — A standard reference on drainage problems. Describes complete line of Nicholson traps in types for practically all applications and pressures up to 1500 lbs; thermostatic, expansion, weight and piston operated.—W. H. NICHOLSON & CO.

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MAINTENANCE, PACKING, LUBRICANTS, WELDING

510 PLASTIC PACKING — Bulletin—Describes various types and styles of K-M plastic packing for general use, for use with petroleum products, for non-frictional applications. — RATHBUN-MANHATTAN, INC.

515 INDUSTRIAL VACUUM CLEANING —Booklet A-702, 4 pages—Describes the wide application of Hoffman heavy duty portable and stationary industrial vacuum cleaning systems in increasing production, improving quality, reducing maintenance costs and promoting better plant safety, cleanliness and morale.—C. S. HOFFMAN MACHINERY CORP., AIR APPLIANCE DIVISION.

517 HOLLOW CENTER PACKING—Folder—Describes Belmont hollow center packing, for exacting and important applications.—THE BELMONT PACKING & RUBBER CO.

529 LUBRICATING DEVICES — Broadside 4500 gives important facts about lubricating devices, with valuable application data and detailed equipment descriptions.—TRICO FUSE MFG. CO.

565 CONTROLLED LUBRICATION — Service Handbook, 32 pages—Describes the Lubriplate film and how its application arrests progressive wear, protects machinery, cuts down costs, and serves diversified applications in industrial, utility and service plants.—LUBRIPLATE DIVISION, FISKE BROS. REFINING CO.

582 CHEMICAL CLEANING — "Cut Maintenance Costs with Dowell Service." an 8-page booklet, describes a special service in the cleaning of industrial equipment with chemicals—economically, conveniently, with scientific control and reduction of outage time.—DOWELL, INC.

599 CASTINGS REPAIRED — Bulletin 105—Illustrates and describes repairs on turbines, compressors, Diesel blocks, heads, liners, steam cylinders, pressure extruders, presses, shears, etc., by the Metalset patented cold method.—METALOCK CASTING REPAIR SERVICE.

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635 GEAR COUPLINGS—Bulletin 57—Describes the Waldron improved Series "A" gear coupling, including standard, heavy duty, mill motor, floating shaft, Jordan, shear pin, cutout, vertical and spacer type couplings.—JOHN WALDRON CORP.

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642 BULK WEIGHING SCALES—Bulletin 1449—Describes the Rekordion "Class 40" Scale, designed for optional methods of feed (belt, screw or vibrating feeder) according to the physical characteristics of the material being handled. Full details on operation, construction and applications for weighing a wide range of bulk materials continuously or intermittently.—THE RICHARDSON SCALE CO.

653 MONORAIL IN THE LAUNDRY—Bulletin LD-4 describes the advantages of handling conveyor hooking with American Monorail. Complete specifications and illustrations of a special laundry lift electric hoist.—AMERICAN MONORAIL CO.

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671 BELT CONVEYORS—Catalog ID-681 —Describes Continental belt conveyors, featuring standard and special idlers and many convenient accessories for application to materials handling.—CONTINENTAL GIN CO.

691 DIFFERENTIAL SPEED REDUCERS —"Streamlined Conspicuous Servo Valuable Space" is the title of a bulletin illustrating the design and giving typical examples of a complete new improved line of differential speed reducers.—WINFIELD H. EMERY CORP.

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331	354	367	406	429	444	449	450	458	474	510	515	517	529	565	582	599
635	638	642	653	660	671	691	707	724	730	742	763	774	808	820	821	837
840	851	864	870	878	1010	1021	1024	1025	1045	1047	810	811	812	813	814	815
816	817	818	819	820	821	822	823	824	825	826	827	828	829	830	831	832
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WATER TREATMENT, AIR CONDITIONING, REFRIGERATION

707 EXHAUST AND VENTILATING FANS—Bulletin D-56—Exhaust and ventilating manual describing the application and performance of Emerson electric ventilating equipment. — THE EMERSON ELECTRIC MFG. CO.

724 DUST REMOVAL—Bulletin 4324, 40 pages, describes mechanical dust equipment, heating, ventilating, drying, air handling and purification equipment, dust collectors and dry cash precipitators, employed in the handling of air. — AMERICAN BLOWER CORP.

730 HOT WATER HEATERS — Bulletin 630 describes the application of water heaters to give exact temperatures at point of use in all sorts of industrial plants for heating process materials, water for washrooms and gang showers and for general hot water use, with or without tank combination.—SARCO CO., INC.

742 WATER CONDITIONING — Bulletin 610—Gives information on the design and application of water conditioning equipment and chemicals, including water softeners, zeolites, filters, purifiers, aerators. Improved softener gives 44% more soft water per regeneration. — ELGIN SOFTENER CORP.

763 STABILIZED WATER TREATMENT — Bulletin 34, 12 pages—Describes the stabilizing treatment of water for semi-recirculating systems, for the prevention of scale and corrosion—the result of a long period of research and the development of a control and a procedure which has given satisfactory results in a wide variety of industrial and utility applications. — NATIONAL ALUMINATE CORP.

774 AIR CONDITIONING — Bulletin 106-A, 8 pages, describes refrigerating, ice making and air conditioning equipment and their services to industrial plants, with photograph and drawing illustrations. "Check List of Typical Frick Equipment."—FRICK CO.

ELECTRICAL

808 MOTORS, TRANSFORMERS, BRAKES—Form SU-3 is a pocket size data book, giving details and prices on motors, transformers and industrial brakes. —WAGNER ELECTRIC CORP.

820 MOTOR CONTROL UNITS—Bulletin 800-B—Describes all light solenoid motor controlled units for machine tools and similar equipment, with various accessory equipment to fit the particular job.—ALLEN-BRADLEY CO.

821 ELECTRIC HEAT — Catalog 42 — Chromalox heat made to order, when and where you want it—Strip heaters, cartridge heaters, immersion heaters, finstrip heaters, tubular heaters.—EDWIN L. WIEGAND CO.

837 ALUMINUM CONDUCTORS — Free Booklet, "Insulation Questions and Answers" discusses insulated aluminum conductors and their applications. Charts, diagrams, illustrations answer basic questions—what conductor sizes, how handled, as actually installed, the details about joints and terminals.—ALUMINUM COMPANY OF AMERICA.

848 PANEL BOARDS — Bulletin 126 — "Modern Design for Instrument Panels and Cubicles"—describes the facilities and products of Falstrom, backed by long years of service to engineers in the utility, chemical, petroleum and industrial fields.—FALSTROM CO.

851 "TUBEOLOGY" — Handbook on Fuses—Intended to help maintenance engineers. Tells what to do when fuses blow, where to look for trouble—what to do after trouble is found—how to select the right type for various circuits—how to choose the proper size of fuse or Fusetron.—BUSSMANN MFG. CO.

856 "KLIPLOK" CLAMPS FOR FUSE CLIPS—Bulletin 5—Describes Kliplok clamps guaranteed to give good contact. Convenient application, eliminating destructive temperatures, burnt fuses and arcing, and to reduce shutdowns and other fuse trouble.—ZERO FUSE MFG. CO.

870 ELECTRIC CABLE — Bulletin SP-1097 — Describes Okolite-Okoprene cables, possessing many advantages from the standpoint of installation, electrical operation, and design. Complete details as to dimensions, engineering data and application. —THE OKONITE COMPANY.

875 POWER CAPACITORS — Manual 50-B — Describes power factor improvements and the problems involved, with helpful data and installation on the use of Sprague capacitors for on-the-spot power factor correction at minimum cost. New impregnant permits units 50% smaller.—SPRAGUE ELECTRIC CO.

MISCELLANEOUS

1010 WELDING AND BRAZING ALUMINUM—A booklet, "Welding and Brazing Alcoa Aluminum"—Gives complete information on Tungsten-Argon welds, 1937 successful in ever-increasing practice. Other types of welding and brazing aluminum.—ALUMINUM COMPANY OF AMERICA.

1021 GRATING FLOORING — Bulletin 1140—Describes Tri-Lok open steel flooring, fabricated without bolts, rivets or welds, in plant installations of flooring, walkways, platforms.—DEARBORN CORP.

1026 GAS-DIESEL ENGINES—Bulletin — Bulletin J-51 — Describes the Type JS gas-Diesel engine, built as 5, 6, and 8 cylinder stationary units developing 425 to 670 bhp. Complete specifications.—OOOPER-BESSEMER CORP.

1035 UNIT HEATERS — Bulletin No. 150-4 describes unit heaters which give quick warm-up to meet sudden changes in weather conditions—horizontal and down blow, non-ferrous heating elements, full protection against corrosion, strains and stresses.—FEDDERS-QUIGAN CORP.

1046 STEEL FABRICATING—Bulletin describes plate, structural and tank fabrication, as furnished by various plants in Alabama and Mississippi—for industrial, utility and marine plants. — INGALLS INDUSTRIES.

1047 ROTARY DUMPERS FOR MINE AND RAILROAD CARS — Booklet 2046-A—Describes and illustrates rotary railroad car dumpers, capable of unloading open-type railroad cars at the rate of 1½ min to a full cycle of dumping and return.—LINK-BELT CO.

Continued on page 141

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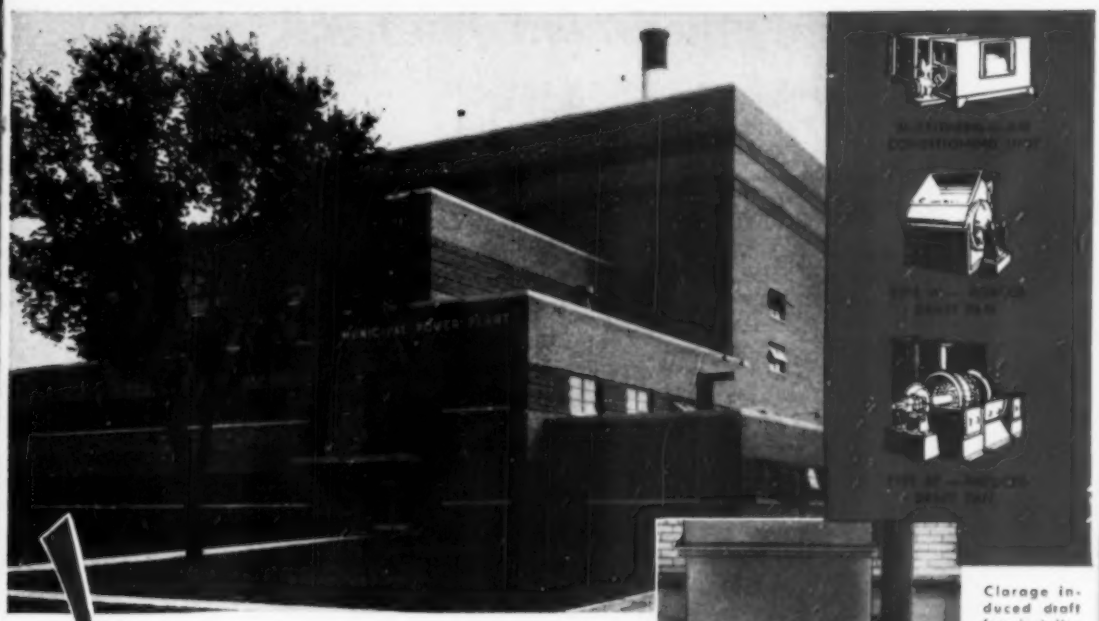

Clarage induced draft fan installation at Litchfield plant. As shown, fan is direct motor driven and has water-cooled bearings.

Office Air Conditioning at Practically No Operating Cost

All offices in this new Litchfield power plant are completely conditioned by a Clarage HEAVY-DUTY *Zone Control* air conditioning unit.

Steam air heaters within the Clarage unit are operated in cold weather. In the summer time, the air is cooled with a heat exchanger which utes the cold make-up water to the power plant cooling tower. *By utilizing this make-up water, air conditioning costs are practically non-existent.*

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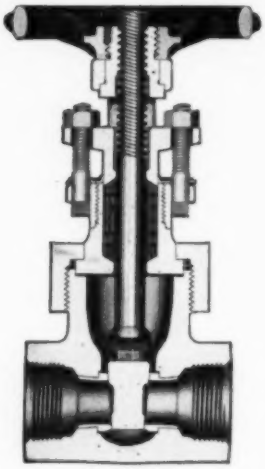

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Sizes: ¼ to 2 in.
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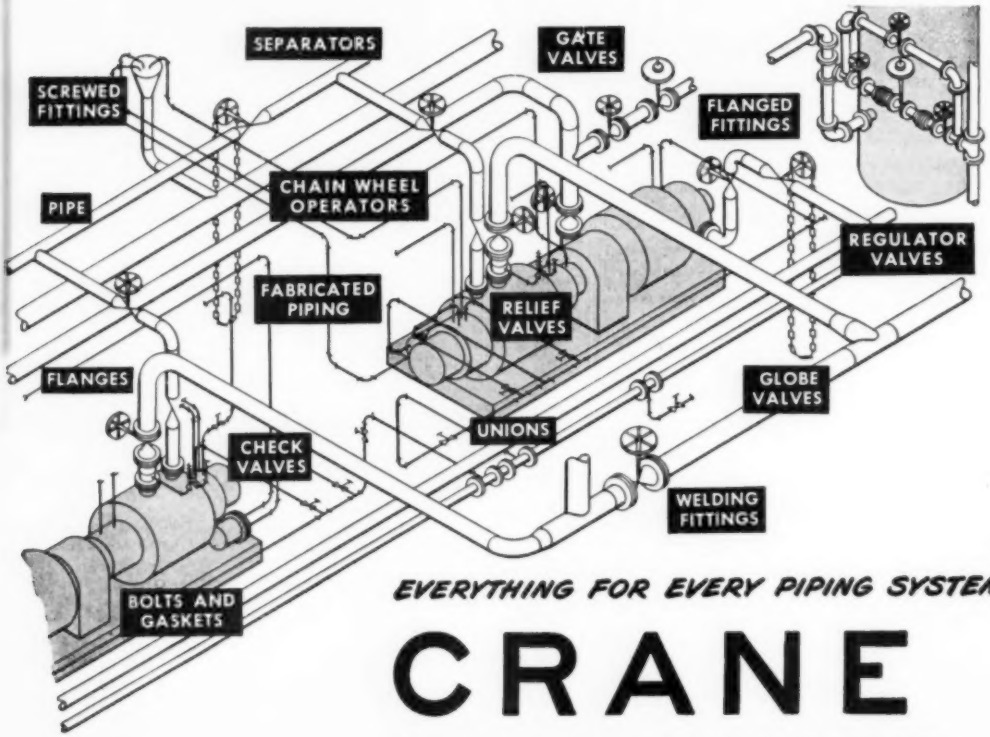

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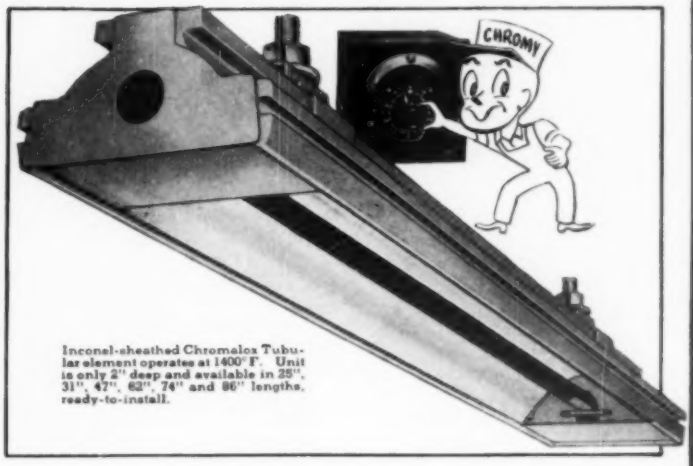

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Quickly and easily installed CHROMALOX Radiant Heaters give uniform heat without hot spots; operate efficiently in low and high ambient temperatures; provide glareless radiation in wave lengths absorbed more efficiently by all colors, textures and surfaces. All-metal construction enables units to withstand shock, vibration, dust, moisture; and eliminates hazards of contamination.

Write today for details on how flexible and dependable CHROMALOX Radiant Heaters can save time, materials and money in your plant.

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EXACT HEAT CONTROL
Finger-tip control at the turn of the input controller knob assures consistent, exact operating temperatures every time!

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Within a few minutes after the input controller is reset, you have a new heat to meet changed temperature requirements.

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It's easy to duplicate required working temperatures day-in and day-out without guesswork by setting the input controller dial to the logged temperature point.

MULTI-PURPOSE or ZONED OVENS
Various zones of heat are possible within the same oven by setting up separate controls for each bank of units. Then each bank can be individually controlled by its own dial.

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Many plants, faced with increasing production costs, have substantially cut working time and costs by using Chromalox Electric Radiant Heaters. If you use heat in your plant for processing, perhaps, you too can benefit by changing to Chromalox Electric Radiant Heat. Look over the typical applications below . . . then send for the full story about this modern heat source.

Application Report 101:
LESS FLOOR SPACE—SAFER OPERATING CONDITIONS are features of a Radiant Heater installation that also provides faster, continuous production for forming soft balls in heated metal molds.

Application Report 103:
SPEEDIER DRYING, NO HOT SPOTS with Chromalox Radiant Heaters result in complete and uniform drying of plastic powders in 10-15 minutes, compared with half-hour with previous heating method.

Application Report 104:
NO DISCOMFORT FOR OPERATOR of punch press while punching holes in plastic strip material. Radiant Heater is used to maintain proper temperature in strips between preheating oven and press.

Application Report 105:
OPERATING IN HIGH AMBIENT TEMPERATURES, Chromalox Radiant Heaters provide a more efficient method for more uniformly knitting asphalt to battery cases. Variable control adjusts heat to battery heights.

Application Report 109:
NO GLARE TO ANNOY PERSONNEL is one feature of Chromalox Radiant Heaters used to dry a cement seal in base of television tubes. Heaters operate on an open conveyor.

Get the complete
RADIANT HEATER
Application Reports!

Yes . . . send me full details on Chromalox Radiant Heaters.

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Company _____

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Mail to: EDWIN L. WIEGAND COMPANY
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PITTSBURGH 8, PA.

IC-48

C. B. Rogers, 1000 Peachtree St., N. E., **Atlanta, Ga.**; L. R. Ward Co., 2711 Commerce St., **Dallas 1, Texas**; 932 M & M Bldg., **Houston 2, Texas**; 1511 Louisiana St., **New Orleans 16, La.**; 1519 S. Boston St., **Tulsa 5, Okla.**; W. R. Phillips, P. O. Box 2561, **Raleigh, N. C.**; W. R. Phillips, Jr., 3125 Lamb Ave., **Richmond 22, Va.**

TERRY

QUICK-STARTING
TURBINE
FOR FEED PUMP
EMERGENCY DRIVE

The turbine shown at the right picks up the feed-pump load in case the motor, which normally drives the unit, is inoperative. Thus the turbine must be able to start quickly and be completely reliable —characteristics which are assured by the generous blade clearances and one-piece construction of the Terry Wheel.

This is but one example of many special turbine requirements that are met by the Terry solid-wheel turbine. Details on how this and other Terry Turbines will meet your individual needs will be gladly supplied by a Terry engineer.

DATA

The turbine is 620 hp, 3550 rpm for 850 psi, 900F steam with 2.5 psi back pressure.

Installed in the Crawford station, Middletown, Pa., Metropolitan Edison Co. Gilbert Associates, Inc. were the consulting engineers.

T-1178

THE TERRY STEAM TURBINE COMPANY
TERRY SQUARE, HARTFORD, CONN.

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that you can use

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Durasheath® is the all-type cable for all-type use . . . in single or multi-conductors.

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Tough Neoprene jacket eliminates rotted braids and jacket damage when pulling.

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Ability of Neoprene jacket to resist oil, alkalies, acids, moisture, makes Durasheath the perfect cable for underground use.

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For more dependable power distribution systems, choose Durasheath. For more complete information contact your nearest Anaconda Sales Office or Distributor. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York.

The right cable for the job ANACONDA®

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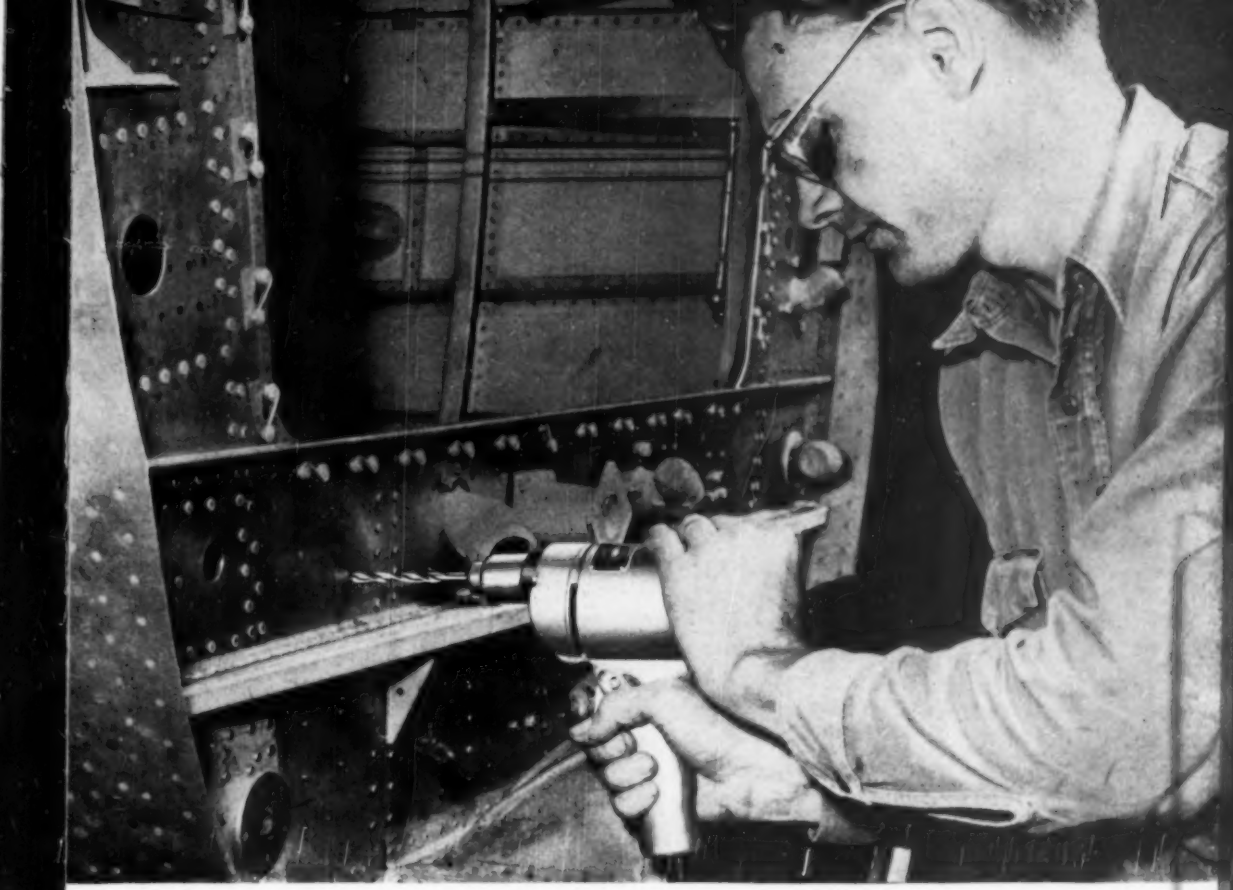
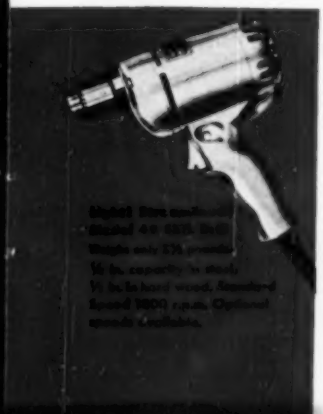


Now the new SKIL Drill model 49

FIRST with the famous LAMB Wedge-Lock HANDLE!

TRY New Model 49 Today! Feel how scientific, patented Lamb Wedge-Lock Handle makes this great new SKIL Drill seem even lighter than it is. See how comfortably and naturally weight is spread between thumb and fingers. Feel how surely it gives safe, firm, easy control.

Here's a drill any operator will take to the minute his hand takes hold of it. Compact, light, tailored to meet latest aircraft industry specifications, Model 49 SKIL Drill will boost your production by hundreds of holes per day. Ask your SKIL Tool Distributor to demonstrate *today!*



SKIL Tools

SKIL Tools are made only by
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"HOT UNDER THE COLLAR" about last winter's fuel bills?

You're probably getting more "heat" out of last winter's fuel bills than you got all winter out of the fuel . . . if your plant had one of those old-fashioned systems that banks the heat uselessly up against the ceiling. You paid for heat, but you didn't get it down at the working level.

Now is the time to do something about fuel savings next winter . . . by pushing the heat down where you need it, with Thermolier Unit Heaters. It's wise to do it right now because you can get Thermoliers and the other materials easily at this season. Skilled labor has the time to do the job just the way you want it. And you're not risking a hurry-up job this fall.

Make next winter a season of heat-saving instead of heat-wasting. Savings with Thermoliers differ, of course, with differences in buildings, but a railroad shop saved 35%; one manufacturer, 29%; and a company operating 50 plants averaged 30%. Your savings may be even larger. Get in touch with Grinnell or your local Thermolier distributor.

THERMOLIER

UNIT HEATING

Construction features that save extra money

Use of plain thermostatic trap, the simplest and least expensive kind of trap, made practical because of Thermolier's exclusive internal cooling leg.

Maximum capacity provided at all times and annoying, destructive water hammer eliminated by built-in pitch of tubes and internal cooling leg which assure continuous drainage of condensate.

Damaging strains caused by expansion and contraction eliminated by "U" type expansion tubes.

Safety and durability assured with leak-proof tube-to-header construction.

Five other important features. Write for Thermolier Catalog.

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Grinnell Company, Inc., Providence 1, R. I. Warehouses: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Cranston • Fresno • Kansas City • Houston • Long Beach Los Angeles • Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Pocatello • Sacramento • St. Louis • St. Paul • San Francisco • Seattle • Spokane

you'll never know

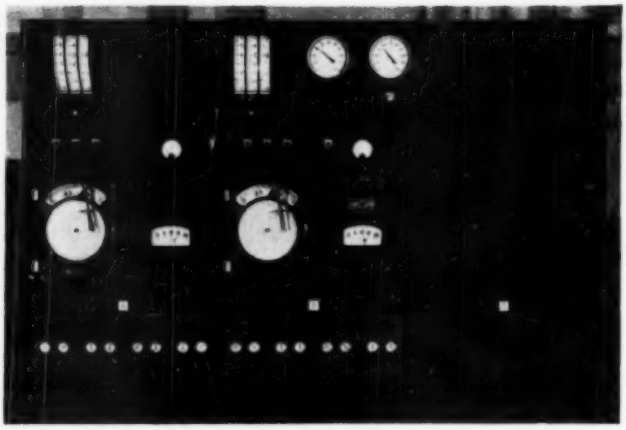
Unless you have used Standard Oil Lubricants throughout your plant, you'll never know the difference the *right kind* of lubrication can make. There is available to you in Standard Oil Lubricants the knowledge accumulated from more than sixty years of lubrication service to southern industry, backed by the largest combined facilities for testing and research of petroleum products in the world. ... If there is any question in your mind regarding the *proper* lubricant for any *specific* need, a Standard Oil lubrication engineer will survey your plant and blueprint your lubrication requirements. Why not take advantage of this experienced service today?

STANDARD OIL COMPANY INCORPORATED IN KENTUCKY

New boilers equipped with HAGAN Controls and Meters at JOHN B. STETSON CO.

In 1865, John B. Stetson, hatmaker, occupied one small building in Philadelphia. Today, John B. Stetson Company is the world's largest manufacturers of fine hats for men and women, with plants in Philadelphia, New York, Danbury, Conn., and Brockville, Canada. Stetson hats have become part of the American legend,—in the ballads and stories of the southwest, every hero's hat is a Stetson.

Recent modernization of the Stetson Philadelphia plant included the installation of two oil fired boilers, with provision for a third—and this installation includes Hagan Combustion Control and Hagan Ring Balance Boiler Meters.



Control Panel, showing three-pen indicating, recording and integrating Hagan Ring Balance Boiler Meters. Panel provides space for meter and control for a third boiler, to be installed later.

Steam is used in the hat making process, and to drive air compressors, vacuum cleaners and auxiliary equipment in the plant, and for heating the many large buildings which comprise the Philadelphia factory. The company also generates its own power.

The Combustion Control at the Stetson plant is a standard Hagan pneumatic system, including steam pressure furnace draft, and fuel-air ratio controls. Boiler meters are of the dual ring indicating, recording and integrating type, providing records of steam flow, air flow and stack temperature.

Hagan Controls and Hagan Ring Balance Meters are in service in plants of all types and sizes, in newly-built plants, and in modernized plants of long-established companies such as Stetson. For full information on these controls and meters, write to Hagan Corporation, Hagan Building, Pittsburgh 30, Pennsylvania.

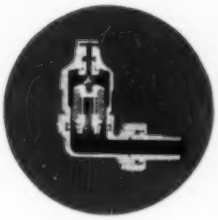
General view of boiler room, United Engineers and Constructors, Inc., Philadelphia, Pa., were engineers and contractors on this installation, working with Stetson engineers.

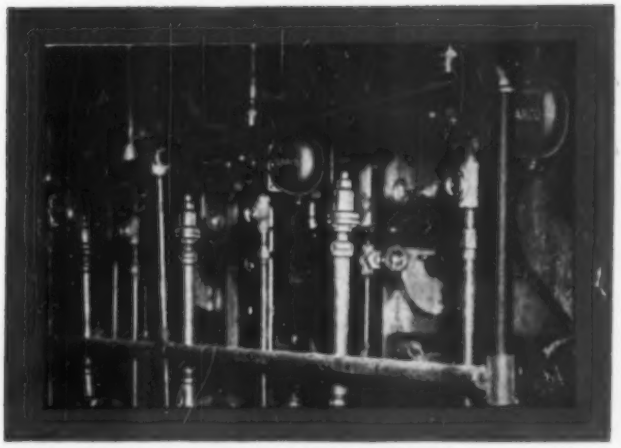
HAGAN HALL BUROMIN CALGON

HAGAN CORPORATION

RING BALANCE FLOW AND PRESSURE INSTRUMENTS
THRUSTORQ FORCE MEASURING DEVICES
BOILER COMBUSTION CONTROL SYSTEMS
METALLURGICAL FURNACE CONTROL SYSTEMS

THE *Why* AND *How* OF AIR VENTING





Trapping and venting rotating cylinders of slasher in textile mill

Every steam man knows that air blocks steam lines, but too many executives do not realize what air in the lines and equipment is costing them, and how inexpensive the devices are that can remove it.

There are two vital reasons why air should be removed at the point where it collects.

First—an air steam mixture always has a lower temperature than pure steam at the same pressure. Steam temperature at 15 psi is 249°F, but mixing 50% of air would reduce this to 212°F, equivalent to 0 psi pressure.

Second; and more serious, the air collects on the heated surface and insulates it from the hot steam, reducing output.

THE SOLUTION

First, select the right steam trap. The Sarco No. 9 Thermostatic for instance is wide open when cold. It lets all the initial air out fast. Other Sarcos let air out too, but only at the point where they are installed.

So the next step is to put in Sarco Air Vents at suitable spots in the lines—at the farthest point from entry of steam in process equipment—and at many points in your heating lines.

This is a subject of renewed interest because Sarco has recently designed a complete line of vents and made available special technical data on the subject.

ASK FOR CATALOG No. 275

SARCO SAVES STEAM

SARCO COMPANY, INC.

Represented in Principal Cities

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SARCO CANADA, LTD., TORONTO 5, ONTARIO

IMPROVES PRODUCT QUALITY AND OUTPUT

You'll probably need new boilers before you need new valves...

When you use...

Homestead BOILER BLOW-OFF Valves

DOUBLE LIFE
"Spare" seat and disc in every HOVALCO. Simply turn them over for good-as-new valve.

This Extra Seat and Disc MEANS DOUBLE SERVICE LIFE

HOVALCO angle valves used in combination with (1) Homestead Lever-Seald or (2) Cam-Seald Quarter-Turn Valves, meet the requirements of A.S.M.E. Code and all state laws for boiler blow-off service. Made in 1½"—2"—2½" sizes for pressures up to 600 pounds.

HOVALCO HOMESTEAD COMBINATION BLOW-OFF VALVES are built to outlast the boiler. Records of 25 to 30 years' continuous use in boiler blow-off service are common, and besides having double the life span of ordinary valves, they cost 30% to 60% less to maintain.

The HOVALCO ANGLE VALVE which takes the abuse and regulates the flow, is equipped with a special *reversible*, long-wearing, "S" Monel seat and disc . . . actually an *extra* set of accurately ground, perfectly matched seating surfaces ready to be put into service whenever the need arises. By simply unbolting the lower valve body and turning over the seat and disc, you have a good-as-new valve ready for another long lifetime of service.

Write today for full information and your copy of Valve Reference Book No. 38.

HOMESTEAD VALVE MANUFACTURING CO.

Serving Since 1892

P. O. BOX 70 CORAOPOLIS, PENNA.


TRI CLAD MOTORS
REG. U.S. PAT. OFF.
will run safely without relubrication for as long as any general-purpose motor you can buy—
and if the application makes relubrication a *must*, you can grease a TRI CLAD *without* halting production
GENERAL ELECTRIC
HERE'S WHY

TRI CLAD MOTORS will run safely without relubrication for as long as any general-purpose motor you can buy—

Tri-Clad extra lubrication "protection" can save you money because:

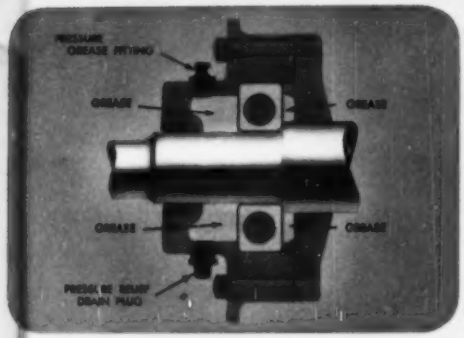
1. Tri-Clad's oversize grease reservoir and the heaviest standard-service bearings mean you do not have to bother with greasing between motor check-ups.

2. When relubrication is needed on those tough applications, you can grease a Tri-Clad without interrupting production-line operations.

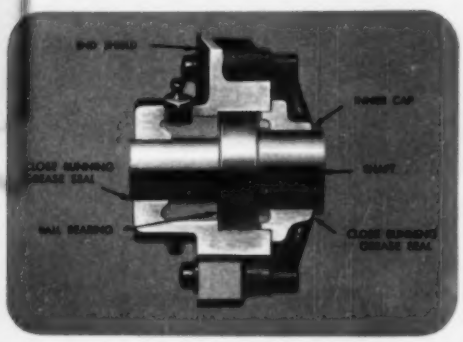
Tri-Clads are grease-gun easy to lubricate *on the job*. Moreover, a Tri-Clad motor will run safely where an ordinary motor would fail. Chances are you'll be spared the cost of a "special" motor.

YOU BE THE JUDGE! The best way to prove to yourself that Tri-Clad gives you the most for your motor dollar is to contact your local G-E office. Tri-Clad stocks are complete. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

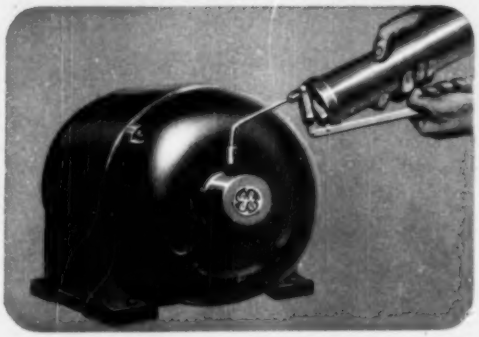
1 **EXTRA BEARING PROTECTION** — Tri-Clad gives you extra bearing protection because heaviest standard-service bearings are carefully selected to withstand severe loads for long periods.



2 **EXTRA GREASE** — Four times the ordinary amount of grease is packed into the large Tri-Clad grease reservoir. Since bearing life depends on grease, this means that Tri-Clad motors will run safely for years — for as long as any general-purpose motor you can buy.



3 **SEALED-IN BEARINGS** — Bearings and grease are completely sealed in a cast housing with long running seals for extra protection from dirt, dust, and lubricant leakage.

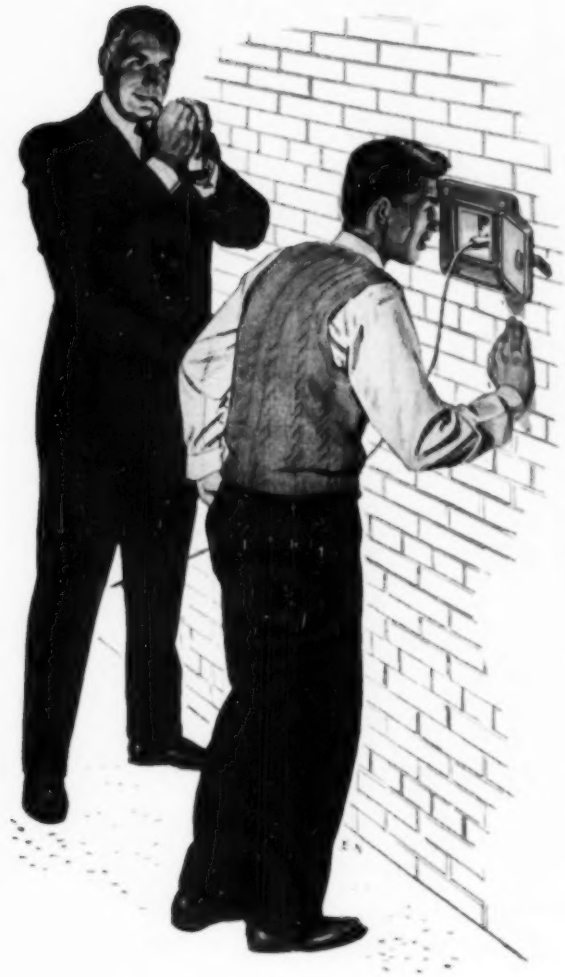


4 **PRESSURE-RELIEF GREASING** — An efficient system of pressure-relief lubrication (with standard fittings) enables a Tri-Clad motor to be quickly and easily greased on the job when and if it's needed.

GENERAL ELECTRIC

752-3

"These brick have been in service since you were born!"



NEARLY A GENERATION AGO, a large copper mining company relined the rear walls of two B&W boilers with B&W 80 Firebrick. For 17 years of constant operation at high ratings these brick provided top, trouble-free, maintenance-saving service.

Today, B&W 80's are one of a wide range of superior B&W Refractories — all designed to give the type of service that means profitable operation. Here, for example, are five B&W castables that will help you speed furnace construction:

KROMECAST
for temperatures up to 3100F

KAOCAST
for temperatures up to 3000F

B&W HYDROCHROME
for temperatures up to 2800F

B&W BAFFLE MIXES
for temperatures up to 2600F

B&W INSULATING CONCRETE-MIXES
for temperatures up to 2200F
PLUS INSULATING EFFECT

Whether your needs are for heavy firebrick, light-weight insulating firebrick, or refractory castables, plastics and mortars, you can find the type most economical for your needs in B&W's complete line of refractories. Call your local B&W Refractories Engineer today.

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GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
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R-350

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SPECIFY ERNST Water Columns • Liquid Level Gages

BRONZE, FORGED STEEL, ALL IRON • FOR ALL PRESSURES AND TEMPERATURES

FOR BOILERS, TANKS, REFINERY SERVICE, ETC.

Fig. 5

Standard vertical bronze water gage, 350 pound design, heavier construction up to 450 lbs. Stainless and forged steel for higher pressures.

Fig. 8

All iron gages for pressure up to 250 lbs., heavier construction up to 350 lbs.

Fig. 8SS—Same fittings made in stainless steel.

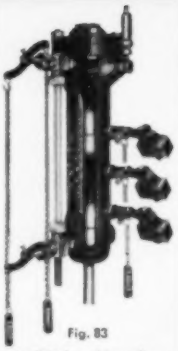


Fig. 83

No. 5 high and low alarm column with vertical gages and DCP weighted type try cocks.

Wire or Phone Ernst

Fig. 1

DESIGNED FOR 250-450-650 LBS. W.S.P.

High and Low Alarm Column Equipped with Split-Gland Type Adjustable Inclined Water Gage

NO GAGE GLASS PACKING NUTS

Simple and easy to install a gage glass. No wrenches or tools required. A turn of the hand wheel compresses the packing.

Insure Safety with ERNST INSERTS

Mica-protected Flat Glass and PRISMATIC REFLEX

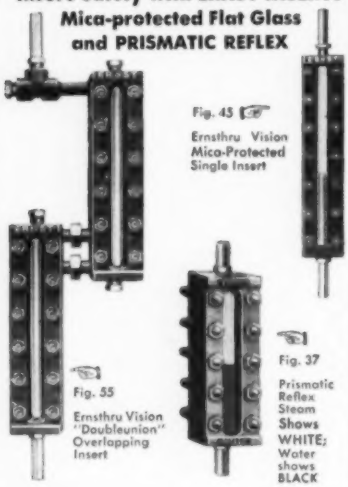


Fig. 45

Ernsthru Vision Mica-Protected Single Insert

Fig. 55

Ernsthru Vision "Doubleunion" Overlapping Insert

Fig. 37

Prismatic Reflex Steam Shows WHITE; Water shows BLACK

Fig. 10

Plain Sight Illuminator

Fig. 31

Ernst Plastic Guard, Replaceable Plates

ERNST LEAKLESS TRY COCKS

Designed for 450-650-1500-2500 lbs.

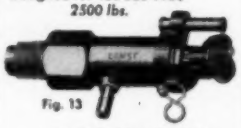


Fig. 13

Ernst Leakless Try Cocks Assure Maximum Safety

Fig. 01

Bronze, with Wheel

Weighted Type Try Cock

Fig. 15

250 lb. Pressure, Bronze, with Iron Weight Double Chain Pull

Spring Type Fig. AS-250

SIGHT FLOW INDICATORS

for insertion into pipelines

"See what's going on" . . . inside

Fig. 17-28 Tubular Glass Type

Fig. E-811 Flapper Type Single Window

Write Ernst

Fig. E-57 Bulls Eye Type Double Window

GAGE GLASSES—Tubular and Flat Type

FLAT TYPE REFLEX AND CLEAR

CLEAR AND RED-LINE MAGNIFYING TYPE

STATE YOUR REQUIREMENTS . . . Send for Catalog

High Pressure Composition RUBBER GASKETS

Manufactured in all sizes to fit your water gages

Specify:

B—Inside Diameter

A—Outside Diameter

C—Thickness

Fig. 21—Lip Mold Rubber Gasket

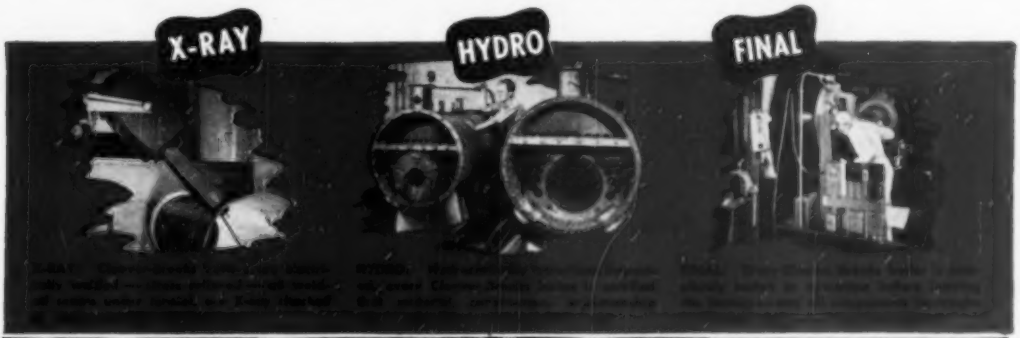
Fig. 22—Standard Rubber Gasket

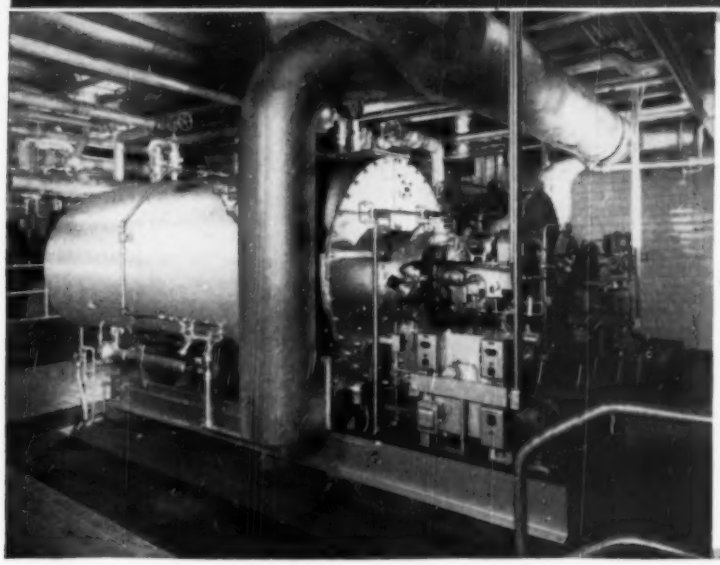
ERNST WATER COLUMN & GAGE CO.

Main Office and Works: 250 South Livingston Avenue, Livingston, N. J. • Phone: Livingston 6-1400

FACTORY-TESTED AND JOB-TESTED

. . . Another Reason Why You Get A Greater Return From Your Investment In A Cleaver-Brooks Steam Boiler





Performance on Location:

Boilers are placed in operation by Cleaver-Brooks service representatives who check installation, operation and make a complete and detailed field report. Your operators are trained in care and operation by Cleaver-Brooks.

Exact and detailed testing—progressively—at successive stages in manufacturing and assembly—operation tests under load at the factory — plus final operation test on location in your plant — these are standard Cleaver-Brooks procedures to assure you in advance of peak performance.

Flexible Operation Burning Gas or Oil With Equal Efficiency: You can use oil, gas, or combination oil and gas, whichever is of lower cost. Through high heat transfer, Cleaver-Brooks boilers operate at a guaranteed efficiency of 80% from full load down to 30% of rating.

In addition, Cleaver-Brooks boilers give you clean, smokeless operation—eliminate fuel—ash handling—require no high or costly stacks—no special foundations — fit under low headroom—provide quick steaming, flexible operation to meet fluctuating loads—fully meet all codes.

Available in sizes 15 to 500 H.P., 15 to 200 P.S.I. — write for new Cleaver-Brooks steam boiler catalog.

CLEAVER-BROOKS COMPANY, 365 E. Keefe Ave., Milwaukee 12, Wis.

Cleaver-Brooks

STEAM BOILERS

NEW — the Cleaver-Brooks Steam Boiler Catalog—interesting—informative—beautifully illustrated. Write—on your business letterhead—for your copy.

WHEN LOAD FLUCTUATIONS

ARE SUDDEN AND VIOLENT...

at THILMANY PULP & PAPER COMPANY

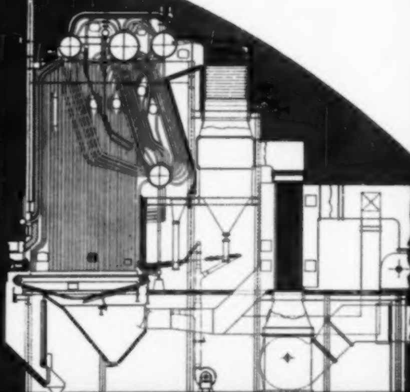
K A U K A U N A • W I S C O N S I N

This is typical Detroit RotoGrate performance. Steam loads on this unit vary in a few minutes from a rate of 30,000 pounds per hour to 120,000 pounds.

Practically uniform pressure is maintained—assuring flexibility.

The trend is toward RotoGrates which cut the cost of producing steam.

Detroit RotoGrate Stoker [illegible] water cooled furnace of a steam generator. Two of the six rotors are removed to show the unique overlapping grate design.



Detroit RotoGrate Stoker applied to a four drum unit having a water cooled furnace, air heater and economizer at Thilmany. Detroit RotoGrate is an advanced design of spreader stoker with forward moving grates that discharge the ash at the front.

DETROIT

ROTOGRATE STOKERS

keep pressure

UNIFORM

Typical Steam Flow-Air Flow and Steam Temperature Charts under normal operation at Thilmany, show rapid load fluctuations from rates of 30,000 to 120,000 pounds with a sustained load of approximately 100,000 to 110,000 pounds per hour.

DETROIT STOKERS

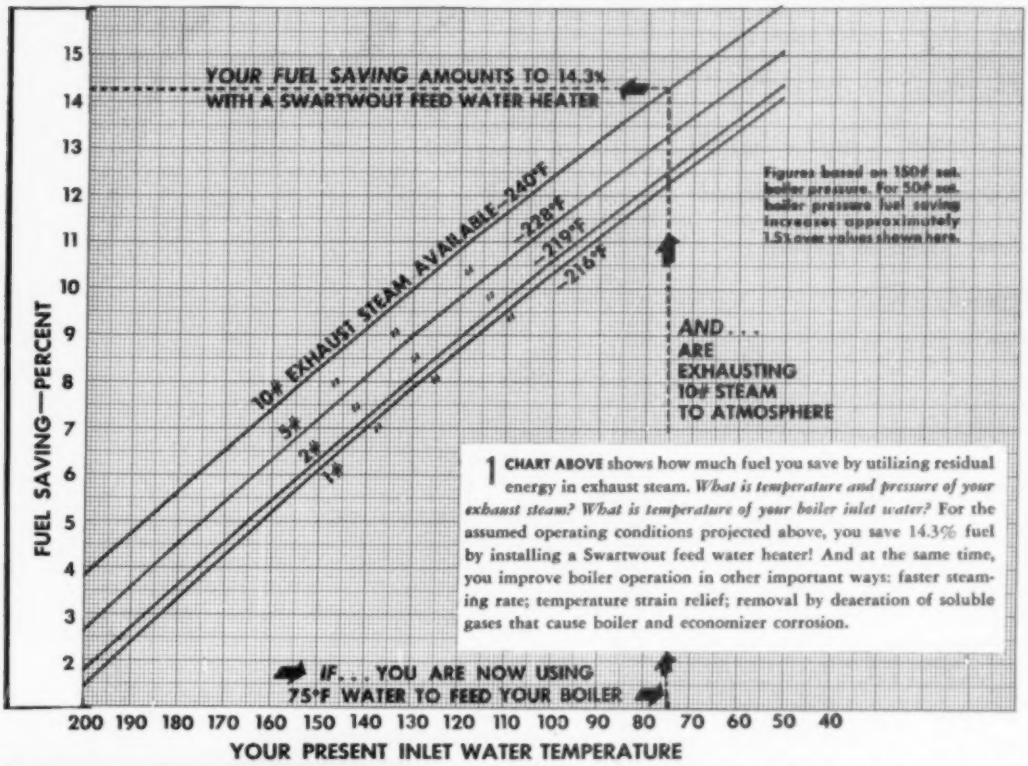
Write for Catalog . . . No obligation

DETROIT STOKER COMPANY

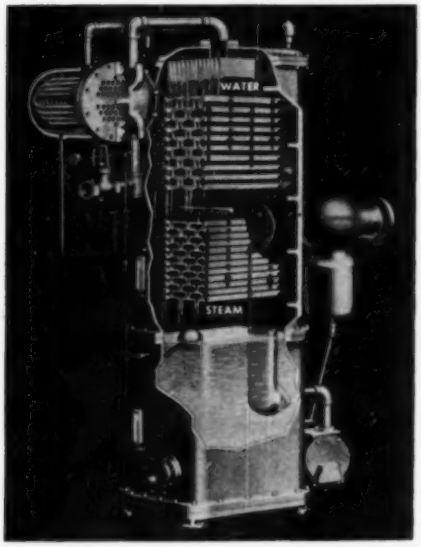
Works at Monroe, Michigan . . . Branch Offices in Principal Cities

OTHER TYPES AND SIZES OF DETROIT STOKERS FOR EVERY INDUSTRIAL OR POWER USE

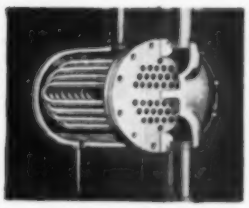
Use exhaust steam! Swartwout feed water heaters save 1% fuel for every 11° temperature rise



1 **CHART ABOVE** shows how much fuel you save by utilizing residual energy in exhaust steam. *What is temperature and pressure of your exhaust steam? What is temperature of your boiler inlet water?* For the assumed operating conditions projected above, you save 14.3% fuel by installing a Swartwout feed water heater! And at the same time, you improve boiler operation in other important ways: faster steaming rate; temperature strain relief; removal by deaeration of soluble gases that cause boiler and economizer corrosion.



2 **COUNTERFLOW** heating and deaerating, a feature of all Swartwout feed water heaters, assures efficient removal of contaminating gases. Just before dropping into storage section, feed water is in contact only with clean steam, thereby preventing reabsorption of oxygen. Through counterflow, last traces of oxygen are removed from feed water according to law of partial pressures of gases.



3 **VENT CONDENSER** is smaller in heaters utilizing counterflow principle. Because less steam does more work, a large condenser is totally unnecessary — important from the standpoint of maintenance economy. Swartwout makes a complete line of deaerating and open heaters —from 5,000 to 300,000 lbs. capacities.

A-2075

Swartwout

POWER PLANT EQUIPMENT

SEND FOR BULLETIN S-18-E • THE SWARTWOUT COMPANY, 18511 EUCLID AVENUE, CLEVELAND 12, OHIO

"We Saved Valuable Space . . . and reduced the cost of a new panelboard . . . when we installed 400 amp. Fusetron dual-element Fuses instead of 600 amp. ordinary fuses."

"After we were awarded the contract for electrical work in a new ice plant, we discovered that the power distribution panel was far too large for the space allotted to it. This panel was to accommodate two 60 horsepower motors, plus several smaller ones.

"There was only one convenient location, so we refigured the panel size based on using Fusetron Dual-Element Fuses. We reduced the panel sections for the 60 H.P. motors from 600 amp. fuses to 400 amp. Fusetron fuses and reduced the sizes for the other motors in proportion.

"The panel fitted the space easily. In addition to saving the necessary space, the cost of the panel was reduced considerably."

E. H. Brown, Vice President
Sanborn Electric Company
Indianapolis, Indiana

FUSETRON FUSES GIVE 10 POINT PROTECTION

1. Protect against short-circuits.
2. Protect against needless blows caused by harmless overloads.
3. Protect against needless blows caused by excessive heating — lesser resistance results in much cooler operation.
4. Provide thermal protection — for panels and switches against damage from heating due to poor contact.
5. Protect motors against burnout from overloading.
6. Protect motors against burnout due to single phasing.
7. Give DOUBLE burnout protection to large motors — without extra cost.
8. Make protection of small motors simple and inexpensive.
9. Protect against waste of space and money — permit use of proper size switches and panels.
10. Protect coils, transformers and solenoids against burnout.

FUSETRON

TRUSTWORTHY NAMES IN ELECTRICAL PROTECTION

BUSS

Fusetron DUAL ELEMENT Fuses

Give All-Purpose Protection

because . . .

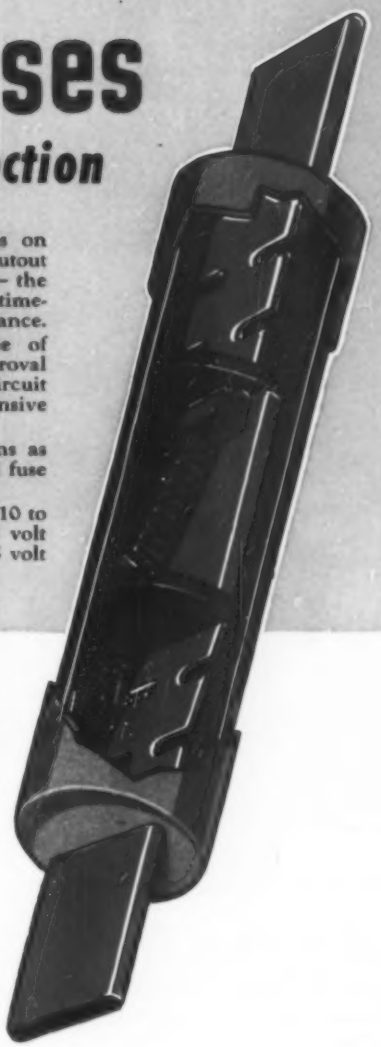
The fuse link element opens on short-circuit — the thermal cutout element protects on overloads — the result, a fuse with tremendous time-lag and much less electrical resistance.

They have the same degree of Underwriters' Laboratories approval for both motor-running and circuit protection as the most expensive devices made.

Made to the same dimensions as ordinary fuses — fit all standard fuse holders.

Obtainable in all sizes from 1/10 to 600 ampere, both 250 and 600 volt types. Also in plug types for 125 volt circuits.

Their cost is surprisingly low.



DON'T RISK LOSSES

One needless shutdown . . .

One lost motor . . .

One destroyed switch or panel . . .

May cost you far more than replacing every ordinary fuse with a FUSETRON dual-element fuse

MAIL THE COUPON NOW for complete information about Fusetron Fuses and their 10 point all-purpose protection

FUSETRON is a trade mark of the Bussmann Mfg. Co., Division of McGraw Electric Co.

Bussmann Mfg. Co., University at Jefferson
St. Louis 7, Mo. (Division of McGraw Electric Co.)

Please send me complete facts about FUSETRON Dual-Element FUSES.

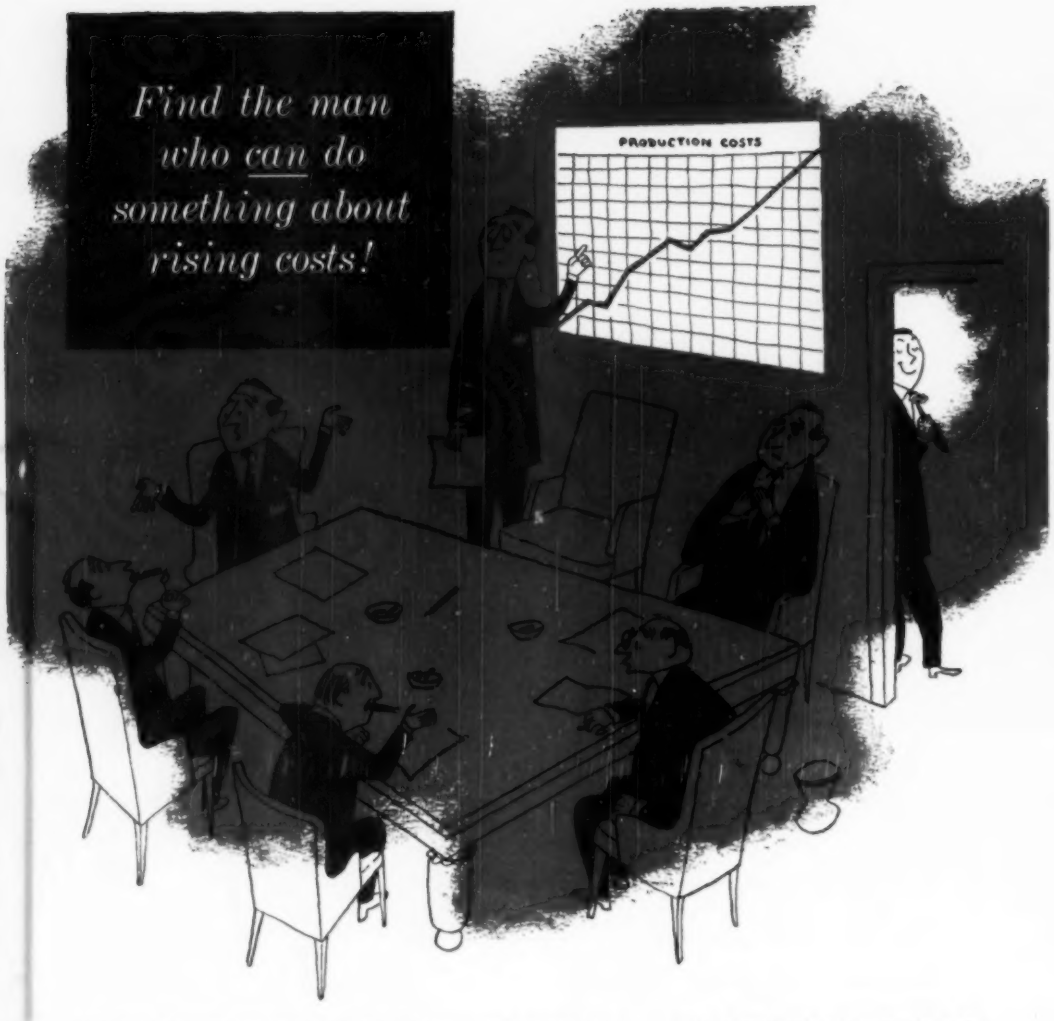
Name _____

Title _____

Company _____

Address _____

City & Zone _____ State _____ 350



In most businesses, operating costs are still on the rise. But there's *one* man who *can* do something about it—he's the man whose job is to get maximum heat and power from fuel dollars. He knows you *get* maximum efficiency from Eagle-Picher Industrial Insulations because they're made of durable, chemically and physically stable *mineral wool*, noted for its low conductivity. They give long years of service and are easy to maintain and replace.

There's an Eagle-Picher insulation that can help reduce *your* operating expenses!

Let these Eagle-Picher products also save you money . . . power . . . time

Insulating Felts
Supertemp Block • Blankets
Loose Wool • Pipe Covering
Stalastic • Insulseal • Insulstic
Swetchek • Finishing Cements
Insulating Cements

THE EAGLE-PICHER COMPANY

General Offices: Cincinnati (1), Ohio

Insulation products of efficient mineral wool—for a full range of high and low temperatures. Technical data on request.

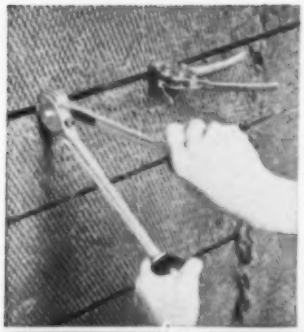
EAGLE EP PICHER

Since 1843

The perfect answer

FOR MAXIMUM FUEL SAVINGS AND EXACT TEMPERATURE CONTROL

For a completely effective, low-cost insulation combination, you can't beat the teamwork of Eagle-Picher Mineral Wool Blankets, Supertemp Blocks, Super "66" Cement and Insulseal. They work effectively to give your equipment higher efficiency . . . cut operating costs . . . and help to provide perfect, precise control over temperatures.



EAGLE-PICHER MINERAL WOOL BLANKETS

These blankets satisfy the need for a convenient method of quickly and efficiently insulating flat or curved surfaces on larger types of heated equipment. Mineral wool is felted and secured between flexible metal fabric. Outstanding physical and chemical stability enable Eagle-Picher Blankets to resist water, steam, corrosive fumes and normal vibration.

EAGLE-PICHER SUPERTEMP BLOCKS

Eagle-Picher Supertemp Blocks are lightweight (approximately 16 lbs. per cu. ft.). Can be cut easily with knife or saw to fit off-shaped areas . . . they fit snugly over minor irregularities. They're strong and have high refractory value. Withstand temperatures up to 1700 F. Conductivity at 512 F. approximately 0.43...all standard sizes, from 3" x 18" to 12" x 36" ...in thicknesses from 1" to 4".

EAGLE-PICHER SUPER "66" INSULATING CEMENT

Super "66" is all-purpose, rust-inhibitive, extremely adhesive insulating cement. "Springy ball" pellets don't collapse after application . . . give great coverage, retain their thermal efficiency. 100 lbs. covers 65 sq. ft. —1 inch thick! Easily applied with trowel, over flat and irregular surfaces. Efficient for temperatures up to 1800 F. Reclaimable when used on equipment whose temperatures go up to 1200 F.!

EAGLE-PICHER INSULSEAL

A tough, weatherproof, protective coating for insulation. For temperatures up to 450 F. Applied as a plastic, its smooth troweling qualities assure uniform coverage, proper thickness. It protects insulation from air infiltration, fumes, rain, snow, vibration, punctures, and withstands severe service, indoors or out. Dries to a smooth, rich black, has a neat appearance on hot or cold surfaces . . . may be washed or painted.

THE EAGLE-PICHER COMPANY General Offices: Cincinnati (1), Ohio

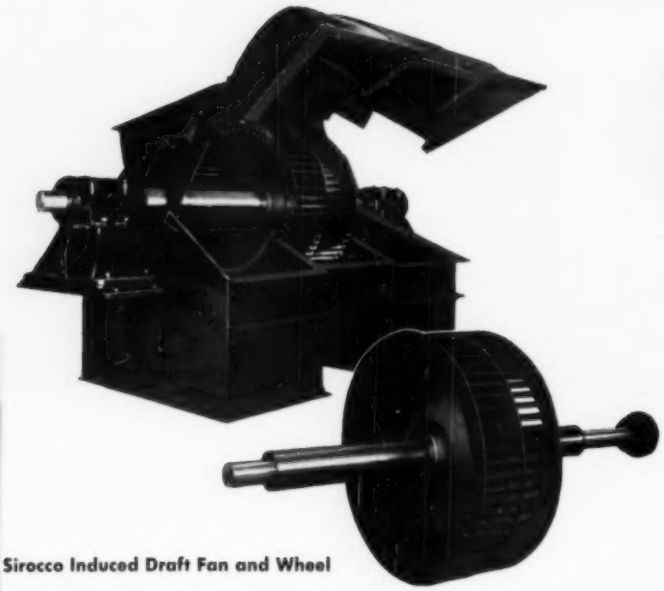
Insulation products of efficient mineral wool—for a full range of high and low temperatures. Technical data on request.

EAGLE EP PICHER

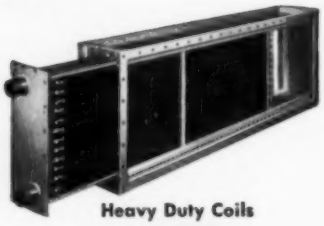
Since 1843

SIROCCO INDUCED DRAFT FANS

Standard of the World

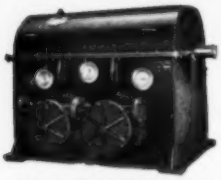


Sirocco Induced Draft Fan and Wheel



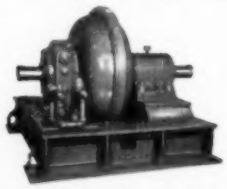
Heavy Duty Coils

American HS Forced Draft Fans



Gýrol Fluid Drives for Boiler Feed Pumps

Type ST Fly Ash Precipitators



Type VS Gýrol Fluid Drives for Mechanical Draft Fans

The Sirocco Induced Draft Fan (shown above) with die-formed forward curved wheel blades is designed and proportioned specially for induced draft work. **Now used on 1,000,000# /hr. steam boilers.**

The high static efficiency, low RPM, low tip speed, low inlet velocity, plus other important operating characteristics, make this fan particularly well adapted to severe power plant requirements.

For complete, concise, factual data on the Sirocco Induced Draft Fan, write for Bulletin 4424.

For data on other American Blower Mechanical Draft Equipment, Fly Ash Precipitators, Heavy Duty Coils and Gýrol Fluid Drives for fan control and boiler feed pumps—consult your nearest American Blower Branch Office.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO
Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

YOUR BEST BUY AMERICAN BLOWER POWER PLANT EQUIPMENT

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How much should a valve cost?

Only as much as is necessary for it to meet all the conditions under which it must operate.

When the service in which a valve is to be used requires special design and materials, it is poor economy to try to make an inexpensive valve do the job. "Down time", maintenance costs, if not actual valve failure, will far more than offset any initial saving.

On the other hand, in a majority of services, standard Powell Valves satisfy all requirements for long, trouble-free performance.

And, because Powell makes all kinds*, it is the soundest economy to standardize on Powell Valves for all your flow control requirements.

Fig. 1331-A — Class 1500-pound Steel Integral Bonnet Offset Globe Valve with welding ends. Also available in "Y" and Angle patterns.

Fig. 1708 — 200-pound Bronze Globe Valve with renewable stainless steel seat and regrindable, renewable "Powellium" nickel-bronze disc.

Fig. 559 — 125-pound Iron Body Bronze Mounted Swing Check Valve. Flanged ends bolted flanged cap and regrindable, renewable bronze seat and disc.

Fig. 1783 — Large 125-pound Iron Body Bronze Mounted Gate Valve. Sizes 2" to 30", incl. Has outside screw rising stem, bolted flanged yoke and tapered solid wedge.

Fig. 11365 W.E.—Class 1500-pound Cast Steel Pressure Seal, Piston-Guided, Horizontal Lift Check Valve, with welding ends. Streamline design permits maximum flow through valve with minimum pressure drop.

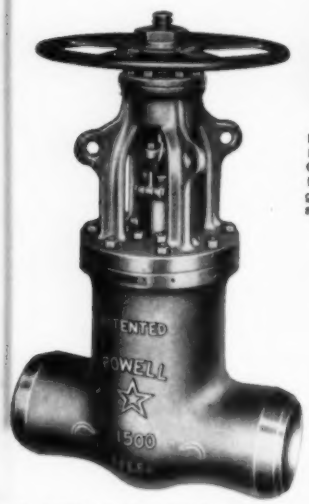


Fig. 11303 W. E.—Class 1500 Cast Alloy Steel Pressure Seal Gate Valve with welding ends.

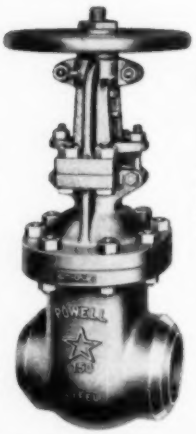


Fig. 1503 W. E.—Class 150-pound Cast Steel Gate Valve with welding ends, outside screw rising stem, bolted flanged yoke and tapered solid wedge.

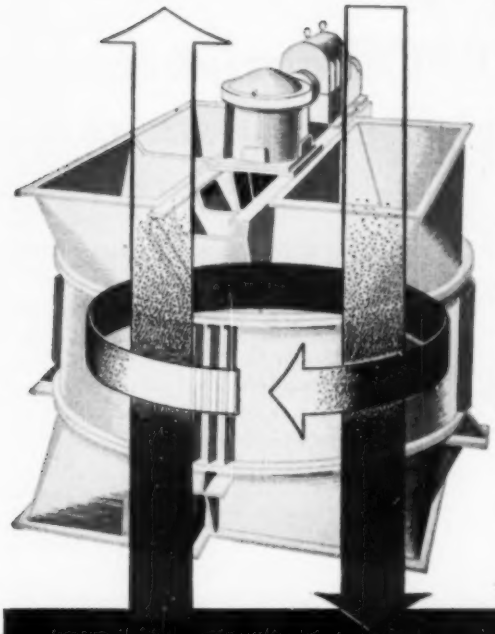
***The Complete Powell Line includes Globe, Angle, Gate, Check, Relief and Flush Bottom Tank Valves in Bronze, Iron, Steel and a wide range of Corrosion-Resisting metals and alloys.**

Ask your nearest Distributor—or write direct

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES



this preheater is cutting fuel costs in hundreds of plants

the *Ljungstrom* AIR PREHEATER

The Ljungstrom operates on the continuous regenerative counterflow principle. The heat transfer surfaces in the rotor act as heat accumulators. As the rotor revolves the heat is transferred from the waste gases to the incoming cold air.

The Ljungstrom air preheater has proved its value in industrial and utility plants throughout the country. That is why every year a constantly increasing percentage of the installed boiler capacity is equipped with Ljungstrom air preheaters.

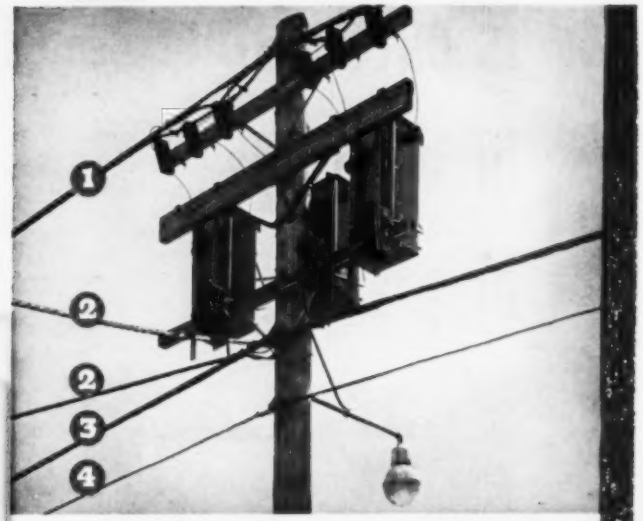
Your fuel costs will be lower too, when your boiler is equipped with the Ljungstrom air preheater. The regenerative design of the Ljungstrom permits reliable operation at low exit gas temperatures. This assures the greatest possible heat recovery . . . reduces the amount of fuel required.

If you are planning a new installation, or expanding your present one, our engineers will welcome the opportunity to show you how the Ljungstrom can raise the overall efficiency of *your* plant.

THE AIR PREHEATER
60 East 42nd Street, New York 17, N. Y.
CORPORATION

4 applications for OKOLITE-OKOPRENE *aerial cables*

. . . with these 16 advantages



1—PRIMARIES 2—SERVICES 3—SECONDARIES 4—LIGHTING CIRCUITS—all on one pole at Bonneville, Oregon.

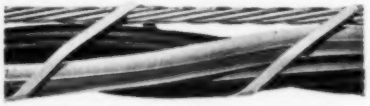
- Most utility engineers now recognize the advantages of aerial cables for primary circuits. Moreover, many are now using this economical cable design for street lighting circuits, for secondaries — including networks — as well as for service drops. For such installations, time-proved Okolite-Okoprene aerial cables — whether self-supporting, ring-supported or spinner-lashed — offer many advantages.

The patented Dualay* assembly, originally designed by Okonite engineers for hot-tapping of Okolite-Okoprene self-supporting primary cables, is also of distinct value for secondary circuits, since services can be taken off at any point, even in mid-span, without racks or spreaders.

In addition to their suitability for utility overhead systems, Okolite-Okoprene aerial cables are extensively used by industrial plants and railroads for power, lighting, communication and control systems. Details on the many types available, with complete data on selection and installation, are available in Bulletin SP-1033. The Okonite Company, Passaic, N. J.

*In the Dualay method (U.S. Pat. 2,430,378) the insulated conductors are twisted together so that the direction of lay is reversed at regular short intervals to permit conductor separation without cutting the copper or performing any operation on the messenger.

- Improved circuit regulation and lower voltage drop through lower reactance.
- Tree trimming reduced or eliminated.
- Overlength poles not needed to clear treetops.
- Fewer service interruptions or outages.
- Reasonable original cost.
- Lower maintenance cost.
- Simple to install.
- Higher safety factor for linemen, people and property.
- Good appearance.
- No festooning.
- Long spans.
- Less congestion on poles.
- Elimination of cross-arms.
- Reduced clearance space near buildings and other structures.
- Greater reliability in storms—resist wind, icing, moisture—operate even if poles are down.
- Messenger serves as neutral.

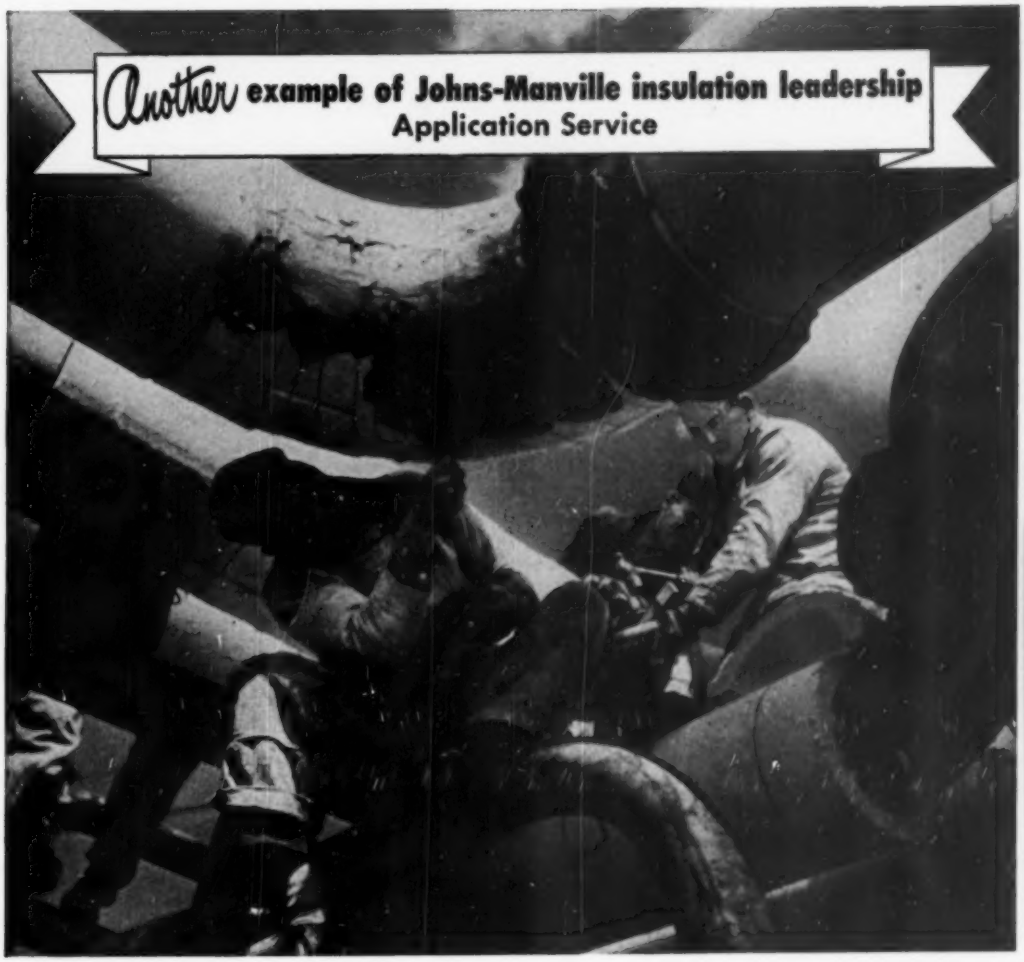


Okolite-Okoprene *Self-Supporting* Aerial Cable with in-built messenger. Made with Dualay* design for easy tapping.

Okolite-Okoprene cables can be lashed to messenger by the *spinner method.*

Okolite-Okoprene cables may be installed in regular *messenger rings.*

OKONITE SINCE 1878 *insulated wires and cables*



Bright future... for this insulation investment

Each day many men in industry ask themselves this question—*Just how should I go about getting the most out of each insulation dollar?* The answer, as with any investment, depends on several factors.

First, there's the reputation of the insulation manufacturer; the type of materials he has to offer; the efficiency of those materials in saving fuel. Next, there is the kind of service the manufacturer offers for engineering and applying his insulations.

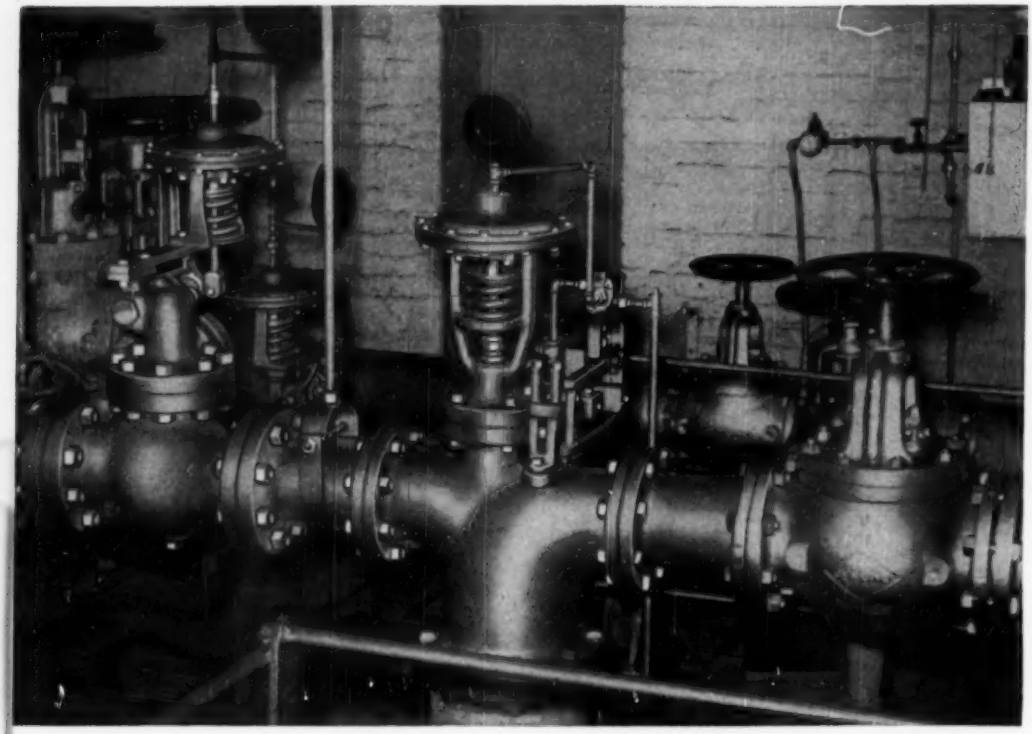
This last consideration is a mighty important one. For, assuming all other things to be equal, it is the selection of the right insulation and the correct application of it that pays off in the long run on your insulation investment.

. . . And that's where Johns-Manville leadership in application service can be of utmost help to you. Your Johns-Manville Insulation Applicator selects the right materials for your specific job from the wide variety of J-M insulations that are available (for temperatures from minus 400F to 3000F above zero).

You will benefit by the long experience of your J-M Insulation Contract firm in all phases of insulation application . . . from engineering the job to the skill of his mechanics in applying the insulations.

If you have an insulation problem, write to the blue chip name for insulation investments—Johns-Manville, Box 290, New York 16, New York.

Johns-Manville *first in* **INSULATIONS**



Close, quiet control of reduced steam pressure and temperature

When it comes to your pressure reducing and desuperheating station, you will find COPES engineers talk your language. They design and size your station to give precise, noise-free control for years to come.

IN THE PICTURE . . .

COPES Pressure Reducing and Desuperheating Station handles up to 25,000 pounds of steam per hour from 450 psi and 509 F to 220 psi saturated. Pressure and temperature are held within close limits demanded for efficient operation of process equipment.

Thus you avoid high velocities, vibration, "chatter" and wear. Your final pressure and temperature are not upset by "hunting"—but hold within the limits you specify.

Your reducing valve has a high lift to equalize wear over more of the piston area, increasing service life. Your Desuperheater completely atomizes the cooling water, even at the lightest flows.

Bulletin 477 tells the story of these accurate, *quiet* controls. Write for your copy—now.

NORTHERN EQUIPMENT CO.
403 Grove Drive, Erie, Pa.

BRANCH PLANTS: Canada, England, France, Austria, Italy. *Representatives Everywhere*

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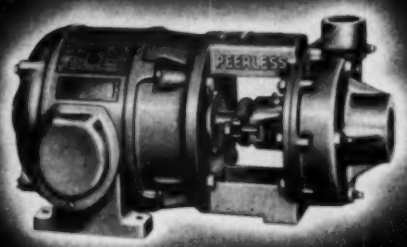
Headquarters for . . .

Boiler Feed Water Control . . . Excess or Constant Pressure Control, Steam or Water . . . Liquid Level Control . . . Balanced Valves . . . Desuperheaters . . . Boiler Steam Temperature Control . . . Hi-Low Water Alarms.

DURABLE • ECONOMICAL • GENERAL UTILITY PUMPS FOR ALL ORDINARY LIQUID PUMPING SERVICES

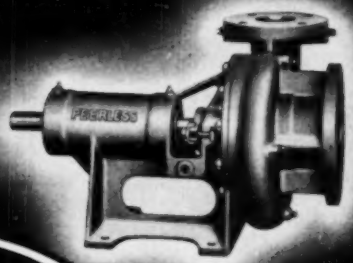
THE PEERLESS *Fluidyne* LINE

CLOSE-COUPLED TYPE
Integral H. P.



Type PE MOTOR SIZE: 1-40 H.P.
CAPACITY: Up to 5500 gpm
HEADS: Up to 270 Feet

BELTED OR DIRECT-CONNECTED TYPE *Integral H. P.*



Type PB MOTOR SIZE: 1-40 H.P.
CAPACITY: Up to 5500 gpm
HEADS: Up to 270 Feet

PEERLESS PUMPS

COMPLETE RANGE OF SIZES FROM ¼ TO 40 H.P.

CAPACITIES: UP TO 5500 G.P.M. • HEADS: UP TO 270 FEET

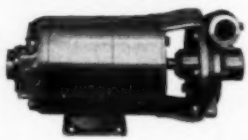
Want compactness? Want efficiency? Want durability? Want economy? You can have them all by using pumps in the versatile and complete line of Peerless Fluidyne general-purpose pumps. Versatile, because they can be applied to a host of diversified services calling for transfering of liquids such as water for air conditioning or cooling and refrigeration systems, mild alkaline solutions, booster service, process uses and many others. Complete, because they offer widest range of sizes and models. The Type PE Fluidyne pump, a close-coupled bracket-type pump is electric drive, available from ¼ to 40 h.p. It is direct-connected to standard NEMA electric motors. The Type PB offers the same wide h.p. range but differs from the PE in that it is built to receive standard V or flat belt pulleys for engine drive, or it can be mounted on a common base with an electric motor and driven by a flexible coupling.

Both Type PE and Type PB Fluidyne pumps are single stage, end suction, centrifugal design. Simplicity and quality and ruggedness are inherent in their design. All parts are easily accessible. Close attention to hydraulic characteristics has resulted in pumping units of high efficiency. Disassembly and assembly for inspection or maintenance is rapid.

Fluidyne pumps operate with unimpaired efficiency in any position—vertical, horizontal or intermediate angle. All parts of exacting Peerless manufacture found only in highest quality pumps. Evidence of their high quality is found in features such as high strength cast bronze streamflow impellers, replaceable bronze wear rings on pump case, oversize packing, drain pocket, ball bearings (PB unit), precision alloy steel shafts.

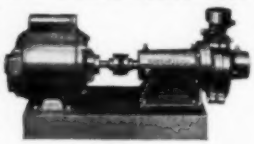
You can probably visualize a score of uses for these dependable, economical pumps. Write today for bulletins describing and illustrating Peerless Fluidyne pumps in the size and type you require.

FRACTIONAL HORSEPOWER CLOSE-COUPLED TYPE PE



¼ to 1 h.p. • 3450 rpm • 60 cycle
Capacity: To 50 gpm • Heads: To 90 Ft.

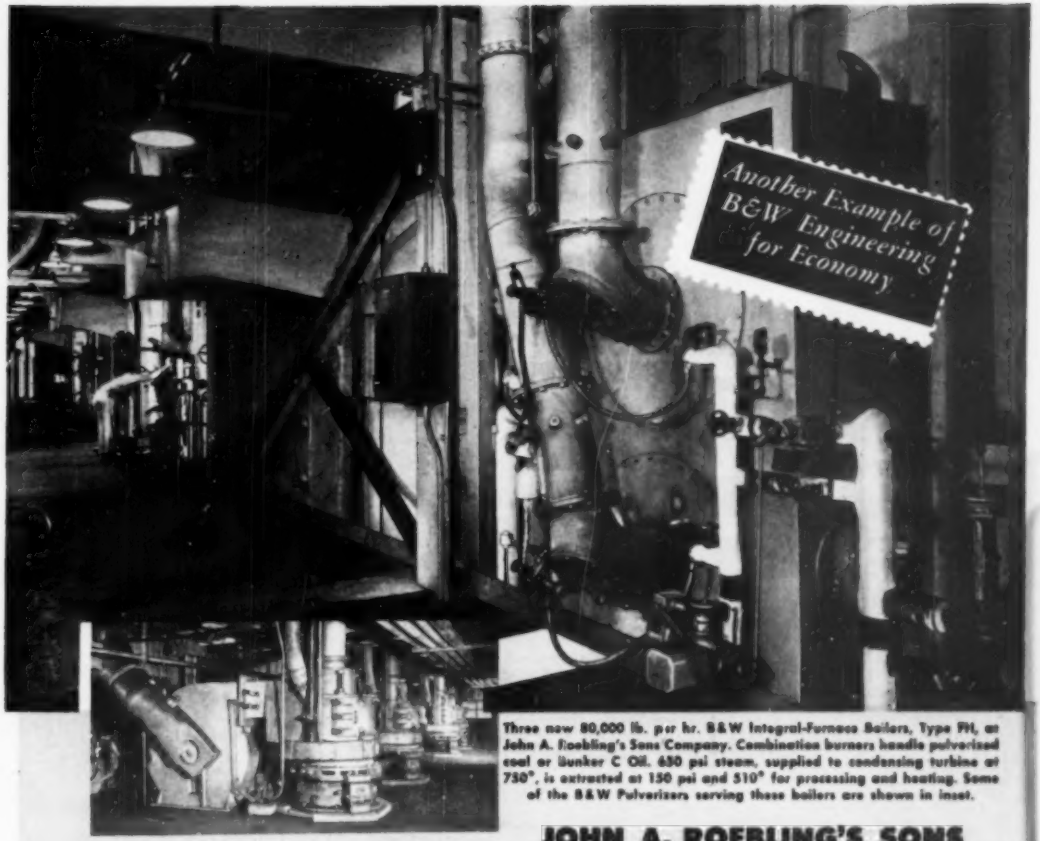
DIRECT OR BELTED TYPE PB FRACTIONAL HP COMMON BASE



¼ to 1 h.p. • 3450 rpm • 60 cycle
Capacity: To 50 gpm • Heads: To 90 Ft.

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION

Factories: Los Angeles, California, and Indianapolis, Indiana
Offices: New York, Atlanta, Fresno, Los Angeles, Chicago, St. Louis, Phoenix; Dallas, Plainview and Lubbock, Texas.



Three new 80,000 lb. per hr. B&W Integral-Furnace Boilers, Type FH, at John A. Roebling's Sons Company. Combination burners handle pulverized coal or Bunker C Oil. 650 psi steam, supplied to condensing turbine at 730°, is extracted at 150 psi and 510° for processing and heating. Some of the B&W Pulverizers serving these boilers are shown in inset.

JOHN A. ROEBLING'S SONS

REPORT $250,000 ANNUAL SAVINGS

WITH NEW POWER PLANT

Saving a quarter of a million dollars a year with a complete new power plant makes mighty good sense to profit-minded management. And that's just what John A. Roebling's Sons Co., Roebling, N. J., are doing with their new steam and electric generating plant — completely equipped with B&W Integral-Furnace Boilers, Type FH, and with B&W ball-bearing-type Pulverizers.

Generation of by-product electrical energy will result in savings of over $100,000 annually — increased boiler efficiency, reduced maintenance and operating labor costs will add another $150,000. These economies — which include a 9,000 ton annual reduction in coal consumption — are expected to pay for the plant in from 8 to 10 years. Constructors were the Rust Engineering Company.

Like Roebling, you will find new paths to profits opened up when B&W Engineers are in on the start of any modernization or expansion program or the construction of an entirely new plant. Their advice has proved eminently sound for more than 80 years. Write today for Bulletin G-38. It gives you complete details on B&W Integral-Furnace Boilers, Type FH. The Babcock & Wilcox Co., 85 Liberty Street, New York 6, N. Y.

BABCOCK & WILCOX

Helping Industry Cut Steam Costs Since 1867

G-448

C-E Assures you the right stoker

for your available coal

for your boiler design

for your load conditions

When you buy a stoker you want the type best suited to *your specific requirements*. You are sure of getting just that when you turn to Combustion Engineering-Superheater. Why? Because a background of more than 20,000 C-E Stoker installations (above residence size) makes available to you an accumulated experience unmatched by any other stoker manufacturer.

In addition, Combustion offers you the most complete line of stokers available today . . . a line that meets every requirement of fuel and load conditions. Therefore, as the manufacturer of *all* types of stokers, Combustion can give you impartial advice in helping you select the *right* stoker.

And at today's cost of coal, getting the *right* stoker can pay handsome dividends. For in an average installation the cost of coal used in a year exceeds many times the initial cost of the stoker. Thus the first cost of the stoker is soon absorbed by its saving in coal.

Typical of the complete C-E line are the three stokers on the opposite page — Skelly, Type E and Spreader. Each represents an outstanding value in its respective field. Each reflects the practical knowledge of fuels and operating conditions Combustion has gained through 60 years' experience in stoker design and application.

Day in and day out, all over the country, C-E Stokers are getting operating results as good or better than those anticipated at the time of purchase. In short, they are the *right* stokers for the job they were selected to do. So the next time you are in the market for stoker equipment, talk it over with Combustion before you buy. B-372

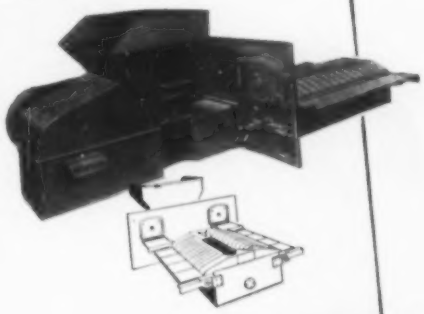
COMBUSTION ENGINEERING

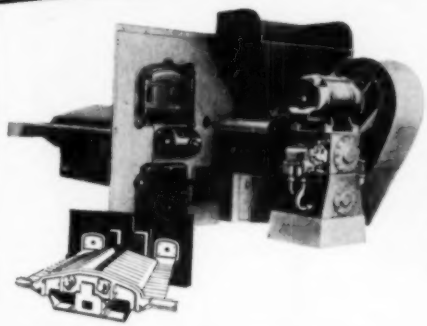
A MERGER OF COMBUSTION ENGINEERING COMPANY, INC. AND THE SUPERHEATER COMPANY

SKELLY STOKER UNIT

Approximate Application Range—20 to 200 boiler hp.

A compact, self-contained underfeed stoker available in designs for burning either anthracite or bituminous coal. An alternate arrangement of fixed and moving grate bars assures lateral distribution of fuel and maintains a clean porous fire. Cantilever dump grates of non-avalanching type simplify ash removal. An integral forced-draft fan, with inlet control, permits positive regulation of air-coal ratio. Sixteen rates of coal feed through variable-speed transmission. Automatic control is standard equipment. Timken bearing equipped. Alemite lubrication throughout.





TYPE E STOKER

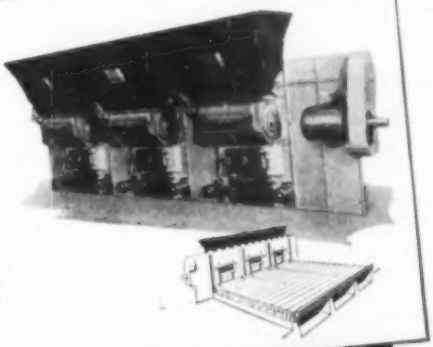
Approximate Application Range—150 to 600 boiler hp.

A single-retort, underfeed stoker designed to burn a wide variety of bituminous coals, particularly those having caking and coking characteristics. The Type E has ram type feed supplemented by a reciprocating sliding bottom. Its grate surface consists of hollow, air-cooled grate bars arranged in an alternately fixed and moving relationship to condition the fuel bed and assure its steady movement to the dump trays which are of the cantilever type. Air supply is under zoned control with provision for introduction of air over the fire. Type E Stokers are available with steam, electric or hydraulic drive.

SPREADER STOKER

Approximate Application Range—150 boiler hp. up to units producing 200,000 lb of steam per hr, or more.

The C-E Spreader Stoker is available in both dumping grate and continuous discharge types. This simple, rugged stoker is designed to burn a wide variety of coals. Hopper, feeding and distributing mechanism, variable-speed drive and motor are combined in a compact unit. Rotating spreader blades feed coal into the furnace in criss-crossing streams which assure uniform distribution. Fines are burned in suspension and the rest of the coal is burned on the grate. Grate surface is zoned for regulating air admission and to facilitate cleaning. All parts subject to wear are readily accessible for inspection, adjustment or replacement, when necessary. Rate of fuel feed and air supply may be regulated over a wide range and are readily adaptable to automatic control.



—SUPERHEATER, INC.

200 MADISON AVENUE, NEW YORK 16, N. Y.

REDUCE PIPE LINE MAINTENANCE COSTS with CHAPMAN

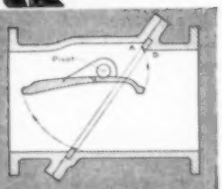
TILTING DISC

Check Valves

Because of their unique design, Chapman Tilting Disc Check Valves *close without slamming*. There is no water-hammer . . . no vibration of pipe lines or adjacent structure. Nor any danger of opening up pipe joints or rupturing pipe lines. All mighty important reasons why maintenance costs are bound to go down when you standardize on this valve with the cushioned closing.

Yet that's only part of the story. Chapman Check Valves also reduce head losses 65% to 85% over conventional type check valves. And, when installed on pump discharge lines, they not only make possible increased pipe-line capacity but also effect substantial power savings.

Why not send for bulletin with engineering data *today*?



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

THE CHAPMAN VALVE MANUFACTURING COMPANY

INDIAN ORCHARD, MASSACHUSETTS

Timely Comments

Education Experience Training

SOME INDUSTRIALISTS criticize educational institutions for not delivering "ready - to - go - to - work" graduates, and many graduates are becoming impressed with the difficulty of finding employment on the basis of their school training. Both points of view are supported by fact. But the blame for this condition does not fall squarely on either the school or the student. Business must reassume its obligation for providing apprentice training.

While there is evidence to indicate that many young people would better go direct into apprentice training rather than college, there is still no place to get that practical training except in industry. And those that are fitted by personality and ability to absorb higher education cannot easily get it anywhere else but in college.

The high cost of living and need for young people to start earning while fairly young seems to leave no other option but for industry to become willing to start them on some kind of work (possibly at a loss) until they can become self supporting. The time required is not long, and the cost to the company is not great. The value of well educated, well trained young employees far exceeds the cost and effort requird to orient and bring them to efficient performance.

Regardless of what may be done in the future, present programs and procedures do not allow the time that would be required by schools to provide both education and training. Furthermore, how could the schools accomplish the specific training that would be necessary to meet industry's highly specialized needs today?

Student training programs that were carried on by most large industries before the war need to be reimplemented, and smaller industries need to emulate the same technique to develop employees for their own needs.

"How much experience have you?" is an unfair question to put to a young person who has had no opportunity to gain experience. And "How much will you pay?" should not be the first and only thought of the young applicant. Both industry and the applicant have something to offer in addition to experience and pay, and returning to the old system of wide awake apprentice training seems the most logical step toward providing opportunities for young graduates and providing high type personnel for industry.

We heard much talk of training programs during the war. All we need now is revival of proven practices.

Industrial Development In Oklahoma

OKLAHOMA'S greatest drive for industrial development is now in progress under the auspices of a new organization headed by Oscar Monrad, vice-president of the First National Bank and Trust Co. of Oklahoma City. Known as the Oklahoma Industrial Development Conference, the organization has set a goal of 2,000 trained workers acting as a team to bring industrial expansion to all of the 77 counties.

The group represents a consolidation of the Industrial and Mineral Resources Conference and the organization which sponsored the national industrial tour of Oklahomans three years ago.

Purpose of the organization is to acquaint Oklahomans with the resources of the state and through that knowledge inform industrial prospects throughout the nation. Special training courses will be conducted in various parts of the state to point out the necessity of each community knowing what assets, plant sites and buildings are available for prospective industries. Mr. Monrad believes Oklahoma is ready for its greatest period of industrial development.

POWERS

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2. Valve Stem Lubrication
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BETTER TEMPERATURE CONTROL

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Simple, Self-Operated, Economical —Dependable

OFTEN PAYS BACK ITS COST SEVERAL TIMES EACH YEAR

When you want a simple dependable control to maintain a constant uniform temperature install a Powers No. 11 Regulator.

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HELPS INSURE A UNIFORM PRODUCT • MANY GIVE 10 to 25 YEARS OF SERVICE

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Has 4" Thermometer dial mounted on top of regulator. Both thermometer and bulb operate from same thermal system. Only one tapped opening required. Gives visual check on performance of regulator. Makes it easy to adjust for the right temperature.

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Gentlemen: Please send me Bulletin 329. Am interested in

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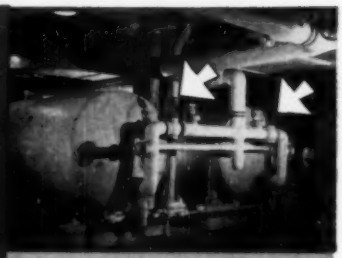
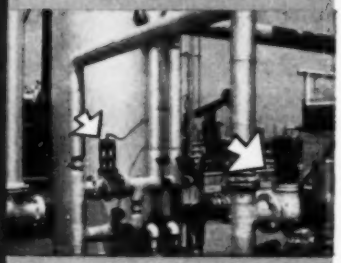
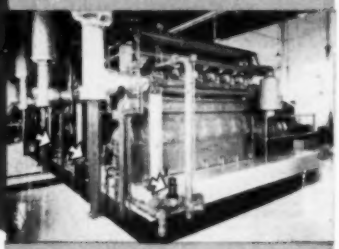
A-11



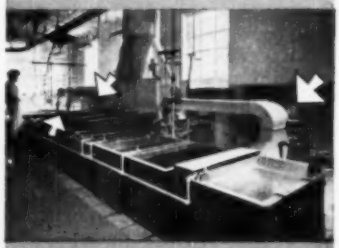
For WATER HEATERS and HEAT EXCHANGERS



For OIL HEATERS and TREATERS



For JACKET WATER COOLING IN DIESEL and GAS ENGINES



For METAL PLATING above below COOKING VATS

Industry Speaks

Excessive Steam Producing Costs Found in Small Industrial Plants

BY SOLON E. FRIEDEBERG
Vice President
Franklin Engineering Corporation

Abstracted from an address by Mr. Friedeberg before a section meeting of the A.S.M.E.

STEAM producing costs in the small industrial steam plant, ranging from 150 to 1,500 hp are, with few exceptions, excessive. Some of these plants lack engineering talent, and many have done little in reducing the amount of labor necessary for operation and maintenance.

The expansion of an industrial plant almost always requires increased service facilities, of which steam for processing, heating, power or refrigeration is an important factor. When such expansion is contemplated, the time is opportune to conduct a complete survey of steam generating capacities and the physical condition of such equipment. The survey must also cover existing steam requirements and the increase of steam load that will be imposed on the steam plant must be determined fairly accurately.

Unsound Methods

Too often when the need for economy or a larger steam supply becomes evident, the improvement, expansion or building of new steam generating facilities is undertaken without necessary engineering information and data.

These are unsound methods and usually result in a plant unable to produce the results anticipated, or one in which the investment is such that fixed charges are out of line with operating costs.

Proposals for steam plant improvement must evidence good engineering and be economically sound to interest plant management. Many opportunities are existent for plant betterment and unless investment in boiler plant improvements can show equally favorable returns they are not likely to be considered.

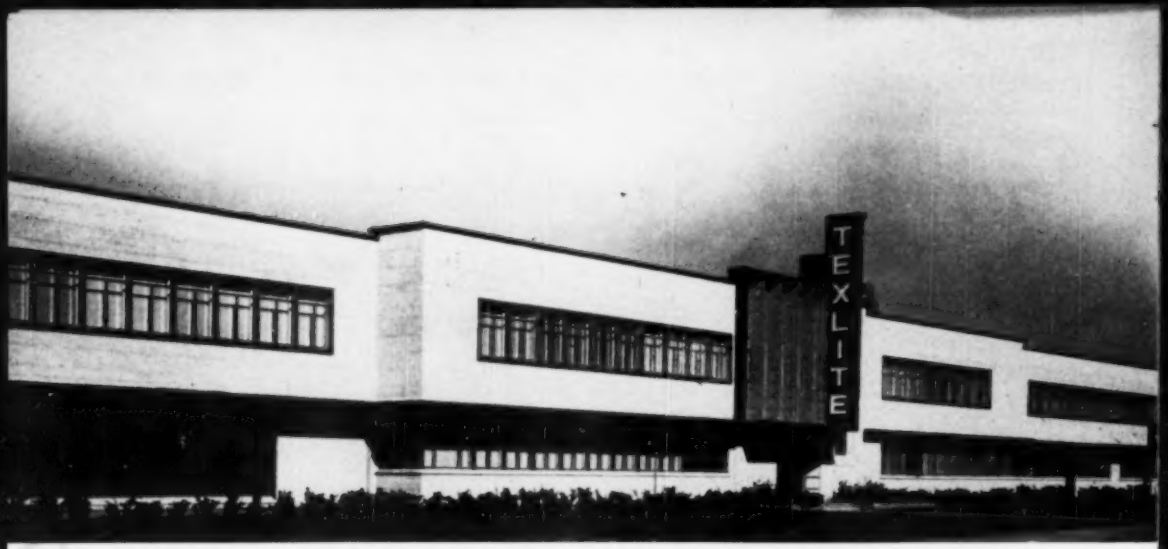
The development of any plan for boiler plant improvement will require information as to existing steam generation and the cost to produce same. The steam generated should be measured. No valid reason exists for not installing equipment to measure the quantity of steam produced. A record of fuel used should also be kept. Fuel-oil and gas can be readily metered. With a little ingenuity the volume of coal consumed can be recorded, converted to pounds and checked periodically against invoices or bills of lading. Knowledge as to the quantity of steam generated per pound of fuel consumed, together with the calorific value of the fuel used, the steam pressure and temperature of the feedwater will be sufficient to approximate boiler plant efficiencies. The existing level of boiler plant efficiency will be a determining factor as to the extent of improvement. Many conditions cause poor boiler plant efficiency. Their cause should be determined by engineers who are qualified to conduct such investigations.

Combustion Controls a Help

Instructing personnel in the proper methods of burning fuel will bring about economies. However, the installation of combustion controls is a definite aid in maintaining such economies, especially where fuel-oil or gas is used. Mechanical means are gradually replacing hand firing in small industrial steam plants. A good stoker installation will effect considerable economy and pay for itself in a reasonable length of time. Plants using coal should also consider coal handling equipment as a means of reducing the amount of labor required to operate the boiler plant.

The mechanization of the plants and the consequent elimination of menial labor would attract higher types of personnel as attendants who would not only maintain the plant in better physical condition but would be capable of keeping records of value to management in determining the cost of steam production.

Boiler plant auxiliaries as well as the boiler house structure should receive careful planning. The results produced by the expansion of an existing boiler plant or the building of a new boiler plant will be directly proportional to the kind of engineering that went into its conception.



LOCATED IN DALLAS, TEXAS' HIGHLY RESTRICTED AIRLAWN INDUSTRIAL SECTION, TEXLITE'S NEW PLANT HAS OVER 114,000 SQ FT OF SPACE IN THE FACTORY, OFFICE BUILDING, AND MEZZANINES. THIS TWO STORY OFFICE PORTION ACROSS THE FRONT IS BUILT OF LIGHT CREAM FACE BRICK WITH A TAN PORCELAIN ENAMEL COPING ACROSS THE FRONT AT THE TOP. A SMALL CANOPY ACROSS THE FRONT AND DOWN THE LEFT SIDE IS ALSO FACED WITH A PORCELAIN ENAMEL FASCIA. THIS FASCIA CONNECTS THE PORCELAIN ENAMEL SOFFIT AT THE FRONT DOOR INTO A SPECTACULAR SIGN AT THE FRONT OF THE BUILDING.

Texlite's New Plant in Dallas, Texas

Here is a description of Texlite's new factory in Dallas, Texas, which is completely equipped to handle a neon sign from the creation by its designers, complete engineering of structures, fabrication and enameling of all faces, fillers and then the building and assembly of the frame and electrical portions.

This article was prepared from information furnished by H. H. WINEBURGH, President, TEXLITE, INC., in collaboration with J. E. BOURLAND, Vice President in Charge of Engineering.

TEXLITE'S new plant in Dallas, Texas, is located on approximately 5.8 acres in one of the most modern industrial sections of the Southwest. The building has a 288 ft front, goes back at its widest point 509 ft and has railway trackage on two sides. Restrictions in the highly planned Airlawn Industrial Section specify that buildings must be set back 50 ft from the street front and prohibit loading docks on any street exposure.

The building is of steel construction with bays 28 ft x 65 ft. All steel, chain operated, sash are provided every 28 ft in monitor type roof, which provides daylight working conditions all over the plant. The roof is of 2 in. gypsum planking with a twenty year bonded built-up roof. The outside of the plant is of brick and corrugated transite with steel wall sash.

The concrete plant floor is of 6-in., 3,000 lb test metallic surface hardened, and is built at railway car and truck loading height. Service ramps are also provided so that trucks can be brought into the plant.

The low bays of the plant have 12 ft clearance to the bottom of roof truss with the roof deck 15 ft above floor. The high bay and area around the continuous furnace has 16 ft clearance with the roof deck 19 ft above the floor. This provides adequate clearance for overhead conveyors. The roof is raised to 30 ft over the hydro press, continuous furnace and box furnaces to provide for clearance and heat traps.

Every consideration has been given to the comfort of the employees. All restrooms are finished in glazed tile including all toilet partitions and shower stalls. All doors on toilet stalls are finished in porcelain enamel panels. The plant is complete with a 28 ft x 50 ft company operated cafeteria for employees. Parking facilities provide for approximately one

Brief History of the Southwest's Unique Texlite, Inc.

Slightly over twenty-five years ago, Texlite, Inc., then known as the Texlite Electric Sign Company, was located on a small unpaved street in Dallas, Texas.

The company's chief manufacturing was that of electric signs. This was in the days before neon, and practically all signs were interior illuminated with raised glass letters or used exposed lamps. The faces were either painted or covered with ground glass known as smaltz. The use of porcelain enamel for sign faces was almost unknown.

First Neon Sign

In 1926, Texlite built the first neon sign of their own, which was erected on a shoe store in Dallas, Texas, and is still burning today. The use of neon gave great impetus to the sign business throughout the country and Texlite outgrew their original plant. They made arrangements in 1927 to occupy a much larger building on Commerce Street in Dallas. The porcelain enamel adaptation to the sign business was increasing in leaps and bounds. At that time Texlite had to buy their porcelain enamel either in Chicago, the West Coast, or in the East. Delivery was slow, and it was very difficult to compete with some of the national companies who were shipping signs into the Southwest.

In 1930, Texlite decided to install a porcelain enamel plant in order to make sign faces for their neon signs.

Expansion

In 1935 a fire destroyed practically everything that was in the Commerce Street plant in the way of machinery, equipment, inventory, etc. The company then bought a building on Factory Street from which Texlite moved last year. This building was built in 1917 and used as a supply depot in World War I. After the war, the government sold the building to a mattress factory and it was in bad condition. Texlite took this building over, did a certain amount of remodeling, completely rebuilt and modernized their furnace and at the same time added more modern equipment.

National Sales

Early in 1937 Texlite realized that there was a tremendous need for all types of porcelain enamel signs, not only throughout the Southwest but in other parts of the country. A new radiant tube furnace was installed which was, at that time, the largest box type furnace in the world. All efforts to sell local neon signs except in Dallas were discontinued, and the major efforts in that department were concentrated in the national field. As Texlite, at that time, was the only porcelain enameling concern in the Southwest, many of the sign companies who were looking for a closer source of supply began buying their sign faces from Texlite, and have been doing so ever since.

A few months after World War II broke out, it became apparent that the sign business would be discontinued throughout the country until after the war was over. Texlite, like many other companies, converted their facilities to war work, fabricating and installing a number of parts for the shipyards along the Gulf Coast. They also manufactured numerous aircraft component parts.

Need for Additional Expansion

After World War II, many companies who had not been able to buy signs during the war had tremendous requirements on hand. Texlite realized the importance of expansion. Application was made to the city of Dallas for a permit to build additional facilities but the city had planned for the expansion of the Love Field Airport adjacent to the factory and refused the permit. The management of Texlite knew they would have to find a new location and build a new plant. At this point, it was deemed advisable to send J. E. Bourland, Chief Engineer, on a trip from coast to coast to investigate all of the newest and most efficient types of manufacture, so that the new plant which was recently occupied would be one that would accomplish three things: (a) the highest quality product possible; (b) economy in operation; and (c) comfortable and pleasant facilities for factory and officer personnel.

hundred cars for employees.

Texlite supplies many sign companies, not only with flat sign faces but with many complicated, architectural shapes. As they have always prided themselves on being able to do a metal fabrication job far beyond what most porcelain enameling companies are in a po-

THE NEW PICKLING DEPARTMENT, 28 X 177 FT, IS OF THE MOST MODERN DESIGN. THIS PORTION OF THE PLANT, COMPLETELY SEALED OFF BY TWO LARGE DOORS, IS OF RIGID TRUSS CONSTRUCTION WITH A GABLED CORRUGATED TRANSITE ROOF AND FINISHED WITH AN ACID-RESISTING, SALT GLAZED TILE. ROOM HAS A 138 FT MONORAIL AND A 2-TON YALE & TOWNE POWER TRAVEL HOIST, WHICH CARRIES LARGE BASKETS THROUGH PICKLING OPERATIONS.

METAL IS RECEIVED FROM A BOX CAR AT ONE END OF THE METAL FABRICATION AREA. IT IS UNLOADED FROM CAR AND HANDLED BY A 5,000 LB CAPACITY CLEVELAND TRAMRAIL BRIDGE CRANE OF 40 FT SPAN WITH A 75 FT CARRIAGE. CRANE HANDLES SHEET STOCK FROM STORAGE AREA TO THE SHEARS. FROM SHEARING OPERATION, METAL TRAVELS BY SEMI-LIVE JACK TRUCKS OR BY PALLETS AND CLARK LIFT TRUCKS TO THE PRESS AND FABRICATION DEPARTMENT.

sition to do, a large portion in the front of the factory has been allotted to house this special metal-working machinery.

The press department is equipped with twelve presses with 36-in. throats and gang punches. The power brake department is equipped with five power brakes from 2 ft up to 14 ft beds. Much of the work fabricated is of a complicated nature requiring hand fabrication, which is performed in a well equipped section of the metal fabrication division. After the metal is fabricated, it is carried to a raw bank storage area which is adjacent to the pickling room of the porcelain enamel department.

Pickling Department

Because of the great importance of the cleansing and special preparation required before metal is porcelain enameled, the new pickling department is of the most modern design and has several new ideas incorporated in its construction. Several features of this department are illustrated.

The tanks are set in a pit which is approximately 6 ft deep with stairs at either end of the pit so that the operator can control the tanks from the walkway, which is in the bottom of the pit. The pickling room is equipped with one steel cleansing tank, one steel rinse tank, a brick acid tank, rinse tank, a nickel and nickel rinse, a steel neutralizer tank and a steel gas fired dryer. Provisions have been made for an additional cleaner tank to be put in later. These tanks are approximately 7 ft 6-in. in depth, 5 ft 6-in. in width and 13 ft 6-in. long. They are designed to accommodate signs 6 ft high x 12 ft in length or for sanitary ware, stove liners, refrigerator liners, and other materials requiring considerable area for pickling.

This room has its own exhaust system. The outside wall is equipped with a honeycomb tile arrangement which lets fresh air in and is exhausted through four 135,000 cfm exhaust fans. These fans change the air once per minute in the pickling room and exhaust the fumes, steam, etc. through the roof. This room is windowless and is lighted by side mounted, wide angle, porcelain enamel reflectors. Built into this pickling room is a complete control laboratory which is also finished in acid resisting glazed tile. This laboratory is complete with all chemical testing equipment to control the pickling room operation.

At one end of the pickling room, sealed off from the acid fumes, is a boiler room which is equipped with an 87 hp, 100 lb, fully automatic boiler. This boiler is complete with automatic pump for pumping steam condensate return into the boiler, low water cut-off, pilot flame failure, gas failure, and with every modern safety device which can be installed upon a boiler. It is a completely automatic operation.

FRIT, THE BASIC INGREDIENT FOR ENAMELING, IS RECEIVED IN CARLOADS AND UNLOADED FROM TRACKS OUTSIDE THE PLANT TO THE SECOND FLOOR STORAGE AREA BY A SERIES OF HARRY J. FERGUSON POWER BUILT CONVEYORS. ONE 26 FT "STREAMLINER, JR." FEEDS TO STATIONARY

UNIT ON SECOND FLOOR. THIS MAKES IT POSSIBLE FOR THREE MEN TO UNLOAD A 60,000 LB CAR OF FRIT IN LESS THAN FOUR HOURS.

The mill room of the new plant is one of the finest and most modern in the enameling industry. The walls and columns of this room are faced with acid-resisting glazed tile, which makes it possible to periodically clean the room with a hose. The operation of this room can be better understood when one understands the tremendous problem of compounding, grinding and

testing over 400 colors in porcelain enamel. Each of these enamel colors are compounded from raw materials by special formulas developed by Texlite over the years.

The storing of the basic materials which go into making milled enamel and the loading of the large pebble mills, in which the enamel is ground, has been a major problem. Much study was given to the layout of this room and it was decided that overhead storage and chute loading of mills was the answer.

A second story section is built over the mill room and laboratory for the storage of porcelain enamel frit. This room has storage capacity to handle six railroad cars of frit at one time.

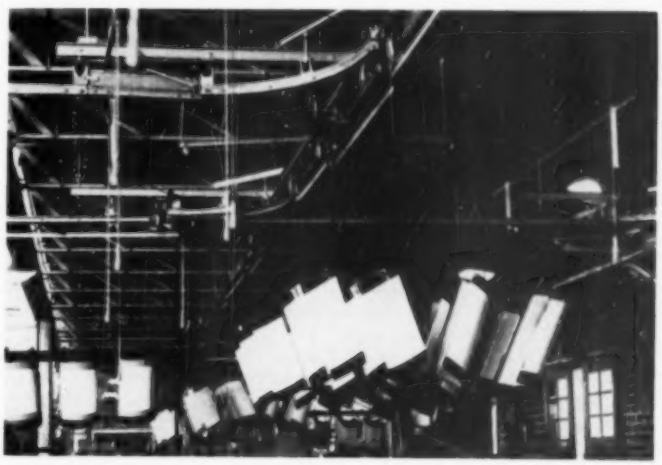
Frit is loaded into any one of a battery of mills in the mill room through hoppers and chutes in the floor of the storage area. Various mill additions and color oxides are blended in the control laboratory and added to frit to make various colors. Water is added to the mill, through a very sensitive, pre-determining water meter which allows the correct amount of water to be placed in each mill. Enamel is ground in water cooled ball mills, which are directly driven by gear-head motors. Each mill is controlled by a revolution counter, so that each mill run is an exact match to master color samples. After mills have ground to exact time, specimens are removed from the milled enamel. Fineness, specific gravity and color match is checked and color samples are made in the laboratory adjacent to the mill room.

J. E. Bourland, Vice President in Charge of Engineering for Texlite, Inc., demonstrates how pickling room service pit, approximately 6 ft in depth, simplifies tank control and maintenance. Outside wall of pickling room is equipped with a honeycomb tile arrangement which lets fresh air in and is exhausted through four 135,000 cfm exhaust fans.

This laboratory is equipped with spray booth, electric laboratory furnace controlled by a pyrometer and timing device, electric dryer, experimental cleaning and pickling set-up and necessary experimental and testing equipment to guarantee continued quality porcelain enamel products. The mill room is equipped with a complete system of floor chases to keep milled enamel and mill washings from getting into sewerage. There are 168 ft of trench which is divided into 14 small settling basins by use of removable weirs. There is also a total of six, large sumps to eliminate all settling in the sewerage lines outside the building.

Spray Booths and Equipment

The porcelain plant is equipped with four spray booths ranging from one 5 ft in width to an 18 ft water washed booth. All spray booths are equipped with 30 gal and 60 gal pressure feed tanks with air driven agitators. All sumps and floor drains have been built into the building for future addition of automatic spray equipment for lay-down type conveyor.



Portion of the extensive monorail system throughout the Texlite plant. This monorail system is designed so that porcelain enamel ware may be hung directly on burning tools from the brushing, screening and/or spraying operation. The charging of these monorail dollies into the slot type furnace will be accomplished by a power driven unit eliminating the necessity of the burner pushing ware into and discharging the furnace after the burning operation.

TEXLITE COMPOUNDS OVER 400 COLORS IN PORCELAIN ENAMEL AND HAS 36 DIFFERENT COLORS WHICH ARE AVAILABLE IN NEON TUBING. HERE IS PART OF A TYPICAL ORDER IN TEXLITE'S SHIPPING DEPARTMENT.

Brushing and Screen Process

The stencil department and dark room for the photographic screen process is located on the mezzanine immediately adjacent to the brushing room and over the rest rooms and superintendent's office of the porcelain plant. The dark room is 20 ft x 20 ft, air conditioned and is equipped to make photographic screens up to 8 ft in length. The dark room is complete with screen developing equipment, dryers, vacuum printing frames, carbon arc lamps, and other equipment for complete fabrication of screens of stainless steel, phosphorus bronze and silk.

The stencil department is equipped with layout tables and necessary equipment for producing paper stencils and zinc stencils as required for fine work.

The brushing room is 55 ft x 72 ft and is closed off from the balance of the porcelain plant. Conveyor chases have been left in the wall for a connection to the continuous furnace when it is installed at a later date. Provisions also have been made for the monorail from the slot top furnace to extend through the brushing room so that the ware can be brushed and hung directly upon the burning tools.

The screen process department is 40 ft x 55 ft and is complete with a gas fired 30 ft tunnel type dryer, so that multicolors can be put on before they are fired. This department is equipped with screening tables with magnetic hold-downs, operated by d-c motor generator sets, which insure perfect registration and control multicolor work. Provisions have been made adjacent to this department for execution of special ceramic art. A unit as long as 30 ft can be set up and be hand painted at one time.

Furnaces

The plant is equipped with two box furnaces and with provisions for a clever burner continuous furnace which will be installed at a later date. One box furnace is a muffle type, 5 ft x 12 ft with a 5 ft side wall. This furnace is loaded with two speed forks. The second box furnace is of a new radiant tube type, semi-automatic, slot in roof design with a firing chamber 5 ft x 13 ft with a 6 ft side wall. The front door on this furnace lowers into a pit at the front of the furnace and the ware is charged into the furnace with a monorail conveyor which passes through a slot in the top.

Plans have been made and provisions made in the roof sections of the building to greatly expand this furnace conveyor system to connect all spray booths, brushing room, screen process area and continuous dryers at a later date. Every care has been taken to protect the furnace men from heat which is usually prevalent around a box type furnace. The building has been built with a 30 ft high ceiling heat trap over each furnace. These heat traps are equipped with gravity heat louvres and power exhaust units so that furnace heat can be dissipated out of the building. The burners and exhaust manifold system at the rear of radiant tube furnace are encased by a heat insulated wall and heat is removed by power exhausters.

Neon Department

The neon department is set up adjacent to the neon assembly and the neon sign fabrication department and is equipped with one glass bending table which is 6 ft wide and 30 ft long and is designed to accommodate six glass blowers. The glass burners are mounted on stands adjustable as to height, two for each glass blower, adjacent to the bending table. All air and gas for operation of these blowers is placed in a floor chase under the floor, with outlets provided for each burner. At each glass blower's working space a cool air duct blows a blast of air from beneath the glass bending tables to provide comfort for the glass blowers. This department is completely equipped with neon vacuum pumps, burning tables and other process equipment required for the complete manufacture and processing of all types of neon tubing and lighting. The neon department is equipped with a 100 amp bombarding transformer for the curing and burning-in of neon tubes.

Neon Frame Building and Assembly

The frame building and assembly department is complete with all structural steel fabricating equipment, Universal iron worker, shears, angle punches and a complete welding department where quantity neon signs are built by use of weld jigs and are assembled in assembly jigs. This department is equipped with a synthetic spray booth for painting of angle iron frames and all metal portions of the sign not finished in porcelain enamel. This booth is 26 ft long x 9 ft wide and is complete with exhaust system which handles 135,000 cu ft of air per minute. Fireproof doors with explosion proof fixtures are used on this spray booth. The roof of this portion of the building is designed so that monorail bridge cranes can be installed for overhead handling of all signs through the assembly operation.

Shipping Department

The shipping department adja-

cent to the neon assembly area is equipped with 16,500 lb floor type dial scales for verifying weights and is located so that signs can be handled with power fork lift trucks directly into railroad cars or trucks for LCL shipment. This shipping department is located in such a manner that it is both close to the neon assembly as to the final processes of porcelain enamel signs and faces. Adjacent to the shipping department is adequate space set up for storage of standard stock letters and standard stock signs which are shipped from Texlite stock to various destinations over the whole United States.

Tool Room

The plant is equipped with a complete tool room, where all Texlite designed fabrication, tools such as blanking dies, forming dies, and assembly jigs are built. This department is equipped with a Van Norman SU 26 Universal Milling Machine, tool room lathes, shapers, V36 and V26 DoALL saws, precision drill presses, die filing machines, radial drill, complete heat treating equipment, with an inspection department equipped with a 36 in. x 74 in. surface table, Rockwell machine and all necessary gauges and equipment for assuring quality production.

Air System

Realizing the importance of adequate clean air the new Texlite plant is installing a completely controlled system. A new Ingersoll-Rand double stage air compressor furnishes 405 cfm. Provisions have been made in the air compressor room for a second unit of the same type and size to be put in at a later date. The air compressor is complete with an inner and after cooler.

These units are cooled with a circulating pump and a water tower located on the roof above. This water circulating system is complete with visible flow indicators, thermometer wells and provision so that the circulation of the water to the cooling tower can be short circuited during extreme winter conditions to eliminate freezing.

Adjacent to this new compressor a 175 cfm Westinghouse compressor is mounted, which is used for auxiliary air and for third shift operation. The air from this compressor flows through the same after-cooler unit which handles the air from the new compressor. This air is pumped into an R-7 air receiver, which is 12 ft high and 5 ft in diameter. From this receiver a 4 in. air manifold system runs the complete length of the building. From this air manifold, headers run out to the various pieces of air operated equipment. The complete air manifold system is laid out so that adequate condensation can be drained from the line. Every attempt has been made to eliminate condensation and oil from the air system.

Special Features

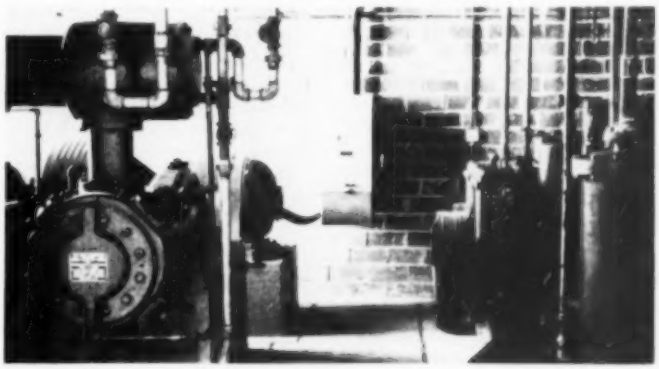
There is a special room for the making of acetylene, and to house the oxygen manifold and tanks. A feature for the comfort of the employees are the very fine tile restrooms conveniently located through the plant. Each restroom has ample showers and lockers so that every employee will be able to prepare himself after work with a minimum of lost time.

The plant is equipped with Yale and Towne semi-live skids with roll away jacks for the handling of sheet stocks through the fabrication department. Clark fork trucks are used for all heavy lifting and moving of material. A special 7,000 lb, 144-in. lift unit handles large signs through the warehouse and crating and loading areas, while a 4,000 lb truck is used in the shipping department for the handling of large cartons, loading and unloading railroad cars and handling boxes and crates. The mill room is equipped with hydraulic lift trucks for handling of milled enamel from the mill to the various spraying booths. All enamel cans are set on steel platforms so they can be handled with a hydraulic jack truck.

Engineering and Designing Department

A complete engineering and designing department is located in the office section of the building. The drafting and designing section is contained within a large office, which is 35 ft x 65 ft. The art department and layout rooms are air conditioned and are lighted with cold cathode continuous strip lighting, which was designed and built by Texlite. Each strip of light consists of four 25 millimeter tubes powered by 200 milliamp cold cathode transformers. All light fixtures are of standard design as manufactured by Texlite. The office portion of the plant is lighted with General Electric Slim Line lamps, each office being equipped with two light units of four tubes each, assuring 60 ft candlepower of light. The complete plant is lighted with 85 watt, two tube industrial fluorescent lamps.

THE INGERSOLL-RAND DOUBLE STAGE AIR COMPRESSOR AT THE LEFT FURNISHES 405 CFM. AIR INTAKE SYSTEM IS FILTERED THROUGH AN OIL FILTER UNIT WHICH IS LOCATED APPROXIMATELY 12 FT ABOVE THE GROUND OUTSIDE THE BUILDING. SERVICE PLATFORM IS PROVIDED SO THAT THESE OIL FILTER MATS CAN BE REMOVED AND CLEANED AS REQUIRED. THE 175 CFM WESTINGHOUSE COMPRESSOR AT THE RIGHT IS USED FOR AUXILIARY AIR AND FOR THIRD SHIFT OPERATION.



Knox Lee Plant

Southwestern Gas and Electric Company

Pressurized Furnace Operates at 8.5 Inches Water Gauge

THREE TRAVELING SCREENS CAPABLE OF HANDLING WATER REQUIREMENTS FOR PLANT OF 180,000 KW ARE INSTALLED.

By Sam Schwieger
Southwestern Gas and Electric Company
Shreveport, Louisiana

ELECTRIC power from Southwestern Gas and Electric Company's new Knox Lee power plant began flowing into the power lines of East Texas in January. The first of two 30,000 kw Preferred Standard turbine generators was placed on the lines several months earlier than originally scheduled. A second identical unit is scheduled for operation early in 1951.

Knox Lee plant is 10 miles southeast of Longview, Tex., near the heart of the huge East Texas oil field. It is named in honor of the late Knox Lee, vice president and East Texas division manager for Southwestern, a pioneer in East Texas electric power developments.

Water Supply

The plant is located on the shores of Lake Cherokee, an artificial lake covering 4,300 acres. The dam and lake, completed early in 1949 and costing approximately a million dollars, was built entirely by business men and sportsmen of East Texas as a fishing and recreational center and for industrial use. Water storage of 62,000 acre feet at spillway level, is in excess of 20 billion gallons.

Cooling water from the lake is brought into the plant by a 280-foot channel from the neck of the lake to the side of the plant. The channel is 10 feet wide at the bottom. The water intake crib which is located at the end of the building has space for three traveling screens capable of handling the water requirements of the ultimate capacity of 180,000 kw.

An intake tunnel six feet high by 14 feet wide extends from the crib under the entire length of the turbine room. Two vertical circulating water pumps, each rated at 22,500 gallons per minute at 25-foot head, extend down to the intake tunnel and are connected through a combination valve and expansion joint directly to the condenser.

Water leaves the opposite end of the single-pass condenser from the bottom of the water box directly into the discharge tunnel which is immediately above the intake tunnel. From the plant the water is discharged through a tunnel eight feet wide by nine feet high to an open channel, 22 feet wide at the bottom to 65 feet wide at ground level. The water is discharged into the lake at a point 10,000 feet distant from the place where the intake channel ties to the lake.

Fuel

Natural gas fuel for the plant is brought in by a six-inch, high pressure line which ties to a 20-inch trunk line of the United Gas Pipe Line Company. The gas comes principally from the Carthage, Texas field, located about 40 miles from the plant, and one of the major gas fields in America.

Buildings and Equipment

The plant proper is housed in a building 80 feet wide and 140 feet long, with an added lower extension of 20 feet for office space. The building is of brick and re-inforced concrete for sub-structure, with outdoor boiler arrangement. Outside brick is light buff, and inside is lighter buff face

brick with light green wainscoating throughout.

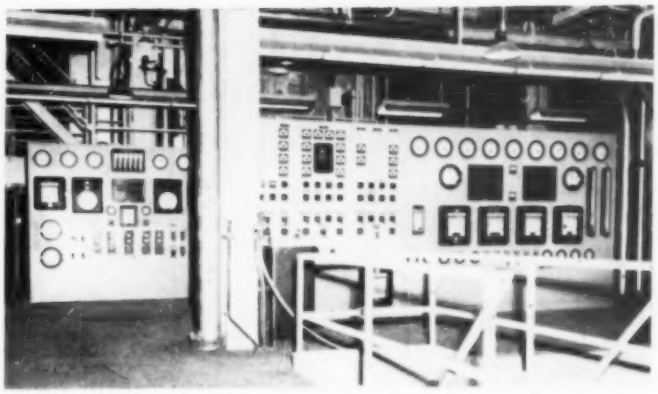
Grade level of the plant is 292.6 feet. Basement floor level is 284 feet and top of building 363 feet. Operating floor level is at 308 feet. The basement floor contains circulating pumps, boiler feed pumps, condensing and auxiliary equipment, shops, battery room and storeroom.

The lobby entrance to the building is an intermediary floor, or first floor of the office wing on a level between basement floor and turbine floor. This includes lobby entrance, locker rooms and rest room facilities. The second floor of office wing includes offices, laboratory and meeting room.

The turbine floor or operating floor houses all control boards, auxiliary switching gear. Several galleries at higher levels give access to deaerating, heating and evaporator control equipment.

Turbines are completely housed within the building and a 50-ton capacity overhead crane is provided that is capable of handling any single piece of equipment. One outdoor type boiler per unit fronts to and forms one side of the building. In a bay 27 feet wide between the turbine room and the boiler front is located the main control board, the boiler control board and the main auxiliary switchgear. Also in this bay on the floor above is located the deaerator, evaporator, two distilled water tanks and the service water tank.

Station service water is supplied by either of two 1,200 gpm vertical pumps. A 15,000 gallon storage tank is floated on the service water header to maintain the supply in case of a pump failure. Water for bearing cooling and evaporator make-up is taken from the tank rather than the header in order to benefit from additional settling time.



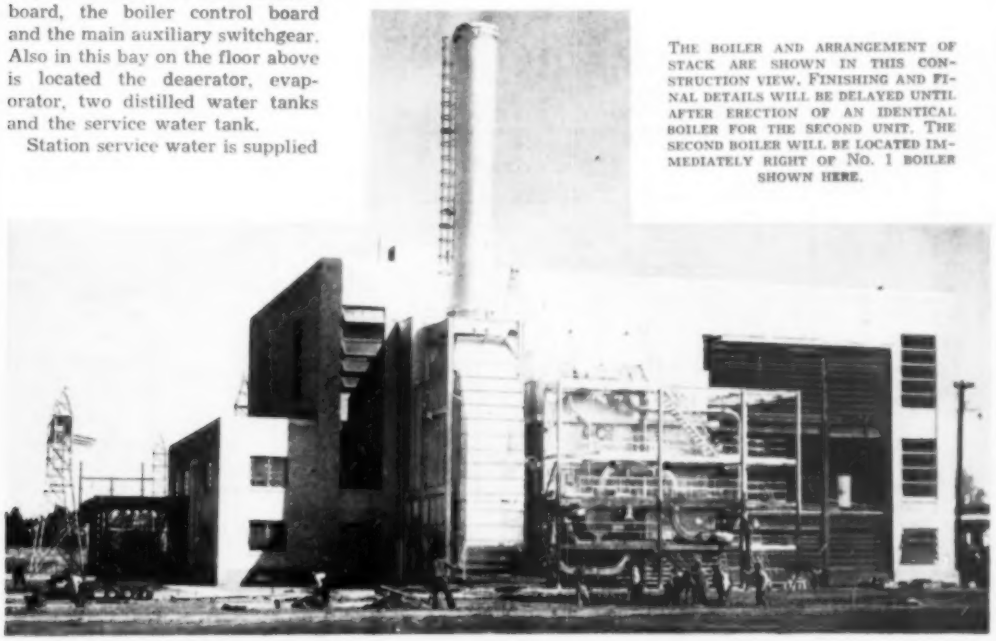
SECTION OF CONTROL BOARD IMMEDIATELY BACK OF TURBO-GENERATOR.

Extraction Turbine

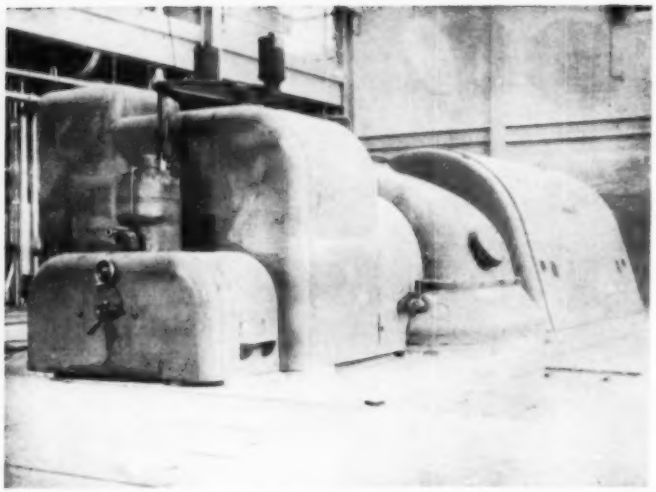
The turbine generator, having one Curtis stage and 28 reaction stages, is supplied with steam at 850 psig and 900 degrees F. Extraction steam is taken from the 15th, 20th, 23rd, and 26th stages and supplied to two vertical low pressure heaters, the deaerating heater, and one high pressure heater respectively. The closed heaters are mounted vertically adjacent to the turbine foundation.

Pressurized Furnace

The boiler is a new departure in design in that the furnace is



THE BOILER AND ARRANGEMENT OF STACK ARE SHOWN IN THIS CONSTRUCTION VIEW. FINISHING AND FINAL DETAILS WILL BE DELAYED UNTIL AFTER ERECTION OF AN IDENTICAL BOILER FOR THE SECOND UNIT. THE SECOND BOILER WILL BE LOCATED IMMEDIATELY RIGHT OF NO. 1 BOILER SHOWN HERE.



VIEW OF TURBO-GENERATOR.

designed for pressure operation. No induced draft fan is required and only one forced draft fan is used. This is a 3,600 rpm, axial flow, single wheel fan driven by a 500 hp constant speed motor and is rated at 100,000 cfm at 25 inches of water pressure. Air flow is controlled by vanes on the inlet to the fan.

Pressure in the furnace at full load is to be at 8.3 inches water, so special care was taken in design to reduce gas leakage through the setting to a minimum. Furnace wall tubes are 3-inches in diameter and boiler side walls have 3-inch tubes with studs. Back surfaces of all of these tubes are sealed with refractory cement covered with a 10-gauge steel skin casing. Five-inch vermiculite block insulation and an outer casing of 10-gauge steel plate completes the boiler setting.

The stack, set on top of the air heater, is steel, gunite lined. Outer diameter is 7 feet, seven inches, and height is 56 feet and three inches.

Advantages expected from the type of boiler are:

1. With no air infiltration through boiler walls, lower excess air may be carried with consequent higher boiler efficiency.

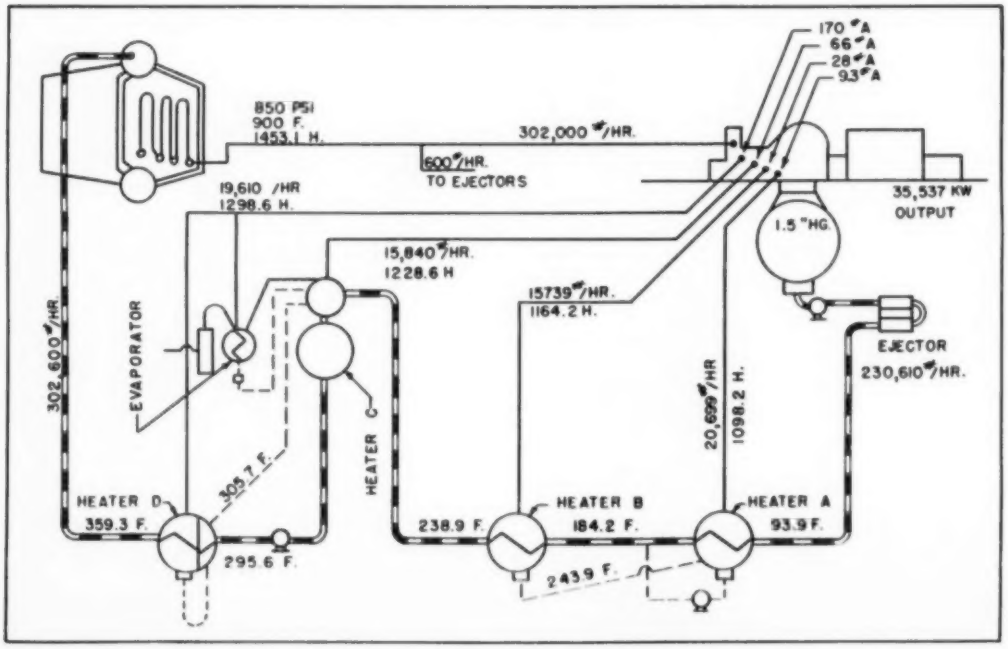
2. Auxiliary power requirements are reduced by 300 hp because of elimination of the inducted draft fan.

3. Simplification of duct and stack arrangement is attained.

Auxiliary Service

The generator is connected through a 35,000 kva, 3-phase, 13,200/138,000 volt transformer to a ring bus composed, at present, of three 132 kv oil circuit breakers.

HEAT BALANCE DIAGRAM, KNOX LEE PLANT



Two outgoing 132 kv lines tying into the other two legs of the ring connect the plant to the system.

A reserve auxiliary transformer, 138,000/2,300 volt, rated at 3,750 kva is connected to a line section of the ring and feeds one end of the metal clad auxiliary switchgroup inside the plant building. The main auxiliary transformer is located on the opposite end of the switchgroup and is connected to the terminals of the generator. It is a 2,500 kva, 13,200/2,300 volt, 3-phase, air-cooled transformer.

Auxiliary motors above 100 hp are 2,300 volt and below 100 hp are 440 volt.

Plant station service is from 2,300 volt switchgear supplied directly from the terminals of the generator through the auxiliary transformer.

Domestic water requirements for the plant are provided by water from deep wells, chlorine-treated.

Earl Lowery will serve as Chief Engineer of the new Knox Lee plant, according to Frank M. Wilkes, President of the company. Lowery formerly operated the company's plant at Marshall, Tex., and in 1928 became Chief Engineer of the Karnack, Tex., plant when it was put into operation.

Principal Equipment

Knox Lee Power Plant—Southwestern Gas and Electric Company

Enston, Texas

GENERAL

Name of Station ..... Knox Lee Power Plant.
Site ..... 10 miles SE of Longview, Texas.
Total Generating Capacity ... 33,000 kw (first unit).
Total Boiler Capacity ..... 302,000 lb per hr (first unit).
Steam Pressure ..... 850 psi.
Steam Temperature ..... 900 F.
Cooling Water Source ..... Lake Cherokee.
Consulting Engineers ..... Sargent & Lundy.

GENERATING UNIT

Turbine-Generator ..... One — Westinghouse Electric Corp., AIEE-ASME preferred standard 30,000 kw, 3,600 rpm, 850 psi, 900 F and 1.5 in Hg. Generator 35,294 kva, 0.85 pf, 30,000 kw, 3,600 rpm, 0.8 short circuit ratio, 3 phase, 60 cycle, 13,800 volt, hydrogen cooled.
Main Exciter ..... One—Westinghouse, 145 kw, 250 volt, direct connected, enclosed self-ventilated exciter.
Pilot Exciter ..... One—Westinghouse, 2.5 kw, 250 volt, direct connected, enclosed self-ventilated exciter.

CONDENSING EQUIPMENT

Condenser ..... One—Allis-Chalmers Mfg. Co., single pass, divided water box, 25,000 sq ft surface containing 3,660 1" tubes 26'0" long, No. 18 B.W.G. arsenical copper.
Circulating Water Pumps ... Two—Allis-Chalmers Mfg Co., 54" x 42" YDVRM vertical pumps per unit; each 22,500 gpm at 25 ft total head, 400 rpm; driven by Allis Chalmers 200 hp, type AMV, 2,300 volt motor.
Condensate Pumps ..... Two—Allis-Chalmers Mfg. Co., 8" x 6" C 2 two-stage pumps per unit, 500 gpm at 310 ft total head, 1750 rpm, driven by Allis-Chalmers 75 hp type ARW 440 volt motor.
Air Ejector ..... One—Allis-Chalmers Mfg. Co., two stage twin element steam air ejector.
Priming Ejectors ..... Two—Allis-Chalmers Mfg. Co., single stage steam ejectors.
Circulating Water Valves ..... Two—Henry Pratt Co., 42" combination rubber seat butterfly valve and expansion joint.

BOILER FEEDWATER EQUIPMENT

Boiler Feed Pumps ..... Two—Worthington Pump & Machinery Corp. 6UX-2, 810 gpm, 2,625 ft head, 3,550 rpm, driven by two General Electric Co. 800 hp Type 6348Z, 2,300 volt, 3,550 rpm induction motors.
Deaerating Heater ..... One—Worthington Pump & Machinery Corp., 302,000 lb per hr horizontal single element, double shell, tray type.
Extraction Feedwater Heaters:
High Pressure .... One—Griscom-Russell, No. 28-180, Style L8U vertical U-tube heater with integral sub-cooling zone 1414 sq ft surface, 640—5/8" copper nickel (80-20) tubes.
Low Pressure ..... Two — Griscom-Russell, Style S8U, vertical U-tube.
Evaporator ..... One — Griscom-Russell, Style J-2, horizontal bent tube evaporator, 12,000 lb per hr net.
Evaporator Preheater ..... One Worthington Pump & Machinery Corp., vertical deaerating heater, with vent condenser, 15,070 lb per hr.

BOILER AND ACCESSORIES

Boiler ..... One—Babcock & Wilcox Company, integral furnace, type FH outdoor type, designed for pressurized furnace, as fired with oil standby, 300,000 lb per hr, design pressure and temperature 1,000 psi, 910 F.
Superheater ..... One—Babcock & Wilcox Company, loop tube. Final temperature 910 F, automatically controlled by attemperator valve regulating circulation of steam through tubes in the bottom boiler drum.
Air Heater ..... One—Babcock & Wilcox Company, tubular, single air pass—two gas pass, 53,300 sq ft surface.
Water Column ..... Diamond, Hi-Lo Alarm—Series 1,500. Two water gauge glasses, 15½" Bi-color.
Blow-off Valves ..... Two sets—Edward, No. 7541 Y, 1½".
Safety Valves ..... Two—Consolidated, No. 1557 HRAX5-8Z, 4". One—Consolidated, 1557 HRDX 5-8Z, 3".

DRAFT EQUIPMENT

Forced Draft Fan ..... One — Sturtevant Division, Westinghouse Electric Corp., No. 24-½-49 axial flow 7-bladed fan with vane control. Designed to deliver 100,000 cfm of air at 25" water static pressure. Driven by Westinghouse, 500 hp, Frame 7113.6-H, 2,300 volt, 3,500 rpm, 3 phase, 60 cycle induction motor.
Stack ..... One—Steel, gunite lined, 7'7" OD, 50'3" high, located on top of air heater.

PIPE AND PIPE COVERING

Pipe Contractor ..... Midwest Piping & Supply Company.
Non-return and Stop Check ... Edward Valves, Inc.
High Pressure Gate Valves ... Crane.
Extraction Check Valves .... Atwood Morrill.
Gate Valves ..... Walworth.
Globe Valves ..... Walworth.
Relief Valves ..... Consolidated—Manning, Maxwell & Moore.
Pipe Covering Contractor .... Armstrong Cork Company. Keasby and Mattison Hy-Temp, Bestfelt and 85% Magnesia. All pipe covering on straight pipe and bends has .020 gauge aluminum jacket. Valves and fittings have canvas jacket.

INSTRUMENTS

Boiler Control Board ..... Republic Flow Meters Co.
Combustion Control ..... Republic Flow Meters Co., air operated.
Feedwater Regulator ..... Republic Flow Meters Co., two point control.
Flow Meters ..... Republic Flow Meters Co.
Pressure Gauges:
Indicating ..... Ashcroft.
Recording ..... Republic Flow Meters Co.
Thermometers:
Indicating ..... American, mercury actuated dial type.
Recording ..... Leeds and Northrup.
Conductivity and CO_2 Recorders ..... Leeds and Northrup.
Turbine Control Panel ..... Republic Flow Meters Co.
Annunciators ..... Edwards.

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SWITCH BOARD EQUIPMENT

Main Control Board .....General Electric Company.
Surge Protective Equipment ..General Electric Company.
Instrument Transformers ....General Electric Company.
Lighting and DC Control Panels .....General Electric Company.

AUXILIARY SWITCHGEAR

Main Auxiliary Transformer ..Moloney, 2,500 kva, air-cooled 13.2 kv—2.4 kv, delta-delta transformer.

2,300 v Switchgear .....I. T. E., multimite drawout type.

440 v Switchgear .....I. T. E., multimite drawout type; with two Moloney, 300 kva, 2,300 volt to 440 volt, air cooled transformers.

Reserve Auxiliary Transformer One—Westinghouse, 3,750 kva, three phase, outdoor, oil cooled, 138,000 volt Y to 2,400 volt delta.

Main Power Transformer ....One — Westinghouse, 35,000 kva, 3 phase, 138,000 volt Y to 13,200 volt delta, oil immersed, self cooled, outdoor type.

Oil Circuit Breakers .....Three — Allis-Chalmers, type BZO-160-138F, 800 amps, 138 kv oil circuit breakers.

Substation Steel, air break switches and disconnect switches .....Southern States Equipment Company.

MISCELLANEOUS

Service Water Pumps .....Two—Ingersoll-Rand Company, vertical, 1,000 gpm.

Distilled Water Tanks .....Two—Moran Tank Co., 20,000 gallon.

Service Water Tank .....One—Moran Tank Co., 15,000 gallon.

Turbine Oil Tank .....One—Moran Tank Co., two-compartment, 1,800 gallon each.

Air Compressor .....One—Worthington, size 12 x 13, type HB horizontal, single stage. Driven by 75 hp, 3 phase, 400 volt, 1200 rpm induction motor.

Turbine Room Crane .....One — Northern Engineering Works, main hoist 50 ton, auxiliary hoist 10 ton, 50' 0" span.

Traveling Intake Screen ....Two—Link Belt Co., with 32' centers. Driven by General Electric Company type ED204, 1½ - 3/8 hp dual torque motor.

New Underground Telephone System for Atlantic Steel, Atlanta, Ga.

5,000 ft duct system, designed to handle current and future expansion requirements, eliminates electrolysis, decreases operator's work, and cuts maintenance costs.

By B. R. Johnson

Engineer
Atlantic Steel Company
Atlanta, Georgia

AS is the case with a great number of industrial plant utilities, the telephone PBX system at Atlantic Steel Company became obsolete due to growth of the plant. When installed, it was adequate and allowed for a reasonable plant expansion, but by modern standards it was unsatisfactory.

An eighty station manual switchboard was located at the main office building with underground jute-covered lead cables serving the plant buildings. The switchboard was loaded to capacity and additional extensions could not be installed. Due to heavy intraplant and outside traffic, the telephone operator was overworked.

A traffic study by Southern Bell Telephone and Telegraph Company in March 1947 showed that sixty per cent of the operator's work could be eliminated by the installation of a 200 station dial switchboard, allowing ample stations for the additional needed extensions and for future expansion.

Old System Inadequate

After the switchboard was installed, attention was brought to the fact that the existing underground system was inadequate and in poor condition. As the cables were installed at a depth of about 18-in. without the protection of ductwork, we were plagued by an intolerable number of phone outages caused by construction workmen accidentally striking the cables. Several of the cables were not accurately located on company drawings—making this condition even worse. No manholes were provided to expedite proper maintenance, repair, testing, and expansion of facilities.

All the roadways along the edge of which the cables are located are

built on a bed of mill slag and cinder fill which makes a satisfactory roadway. However, the presence of oils, iron and acids in this bed created an excellent galvanic couple with the cable's lead sheath, causing extensive cable damage due to galvanic corrosion. Electrolysis, attributed to stray currents, caused additional damage that resulted in many cable pairs having to be removed from service.

New Duct System

Obviously, this system was unsatisfactory from service and maintenance cost standpoints. Therefore, after an extensive study by Southern Bell engineers, a duct system was designed incorporating approximately 5000 ft of 2-in. conduit and eleven manholes.

All details of design were completed by January 1949, and the contract for the duct system let to Wright and Lopez Company. Upon completion of the ductwork, the jute-covered lead cables were installed by Southern Bell. Design and construction were in accord with Bell System practices except where special conditions rendered them impractical to follow.

With due regard to probable future plant expansion, the system was designed around the eleven manholes properly located to serve all buildings. Small manholes 3 ft wide x 4 ft long x 4 ft deep were used because of the constricted conditions in a majority of manhole locations. Two-duct runs were installed from the switchboard to the first manhole and between adjacent manholes, the second duct being installed as a spare to facilitate expansion or to be used in case of damage to the duct in service. A new cable can be pulled in, if the cable in service develops a fault, thus restoring service with less delay than by removing existing cable to repair or replace it. One-duct runs were installed from manholes to serve the individual buildings.

Conduit

As it is best suited for this type installation, 2-in. Johns-Manville Transite Conduit was employed for ductwork throughout the system. Because it is constructed of non-conductive materials, asbestos fiber and cement, and the joints are sealed to exclude liquids, this conduit eliminates the problems of electrolysis and galvanic action. Its strength is such that when installed under roadways it will sustain any load that will normally be put upon it. Mechanical strength and comparatively light weight make possible long, easily-handled lengths. This fact, along with the use of easily assembled tapered couplings, makes for quick and easy installation.

Safety Factor

An accurate map showing the exact location of the ductwork has been made, prints of which have been distributed to all foremen whose men are involved in construction work to allow them to become familiar with the location of telephone ducts. This coupled with the fact that the ducts were installed at a minimum depth of thirty inches practically eliminates the possibility of damage by construction crews.

Advantages

Since the new system was put into service, we have had no phone outages traceable to faulty underground system. Electrolysis and galvanic action have been eliminated for all practical purposes and service has been excellent.

Future plant expansion will present no great problem in so far as telephone service is concerned. Service can be provided by installing duct from the nearest manhole, pulling in necessary cable, and splicing to extra pairs at manhole provided for this purpose.

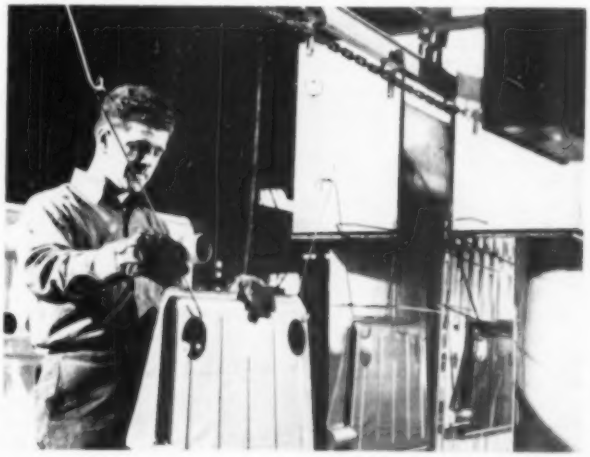
Infrared Ovens Supplant Vapor Degreasers

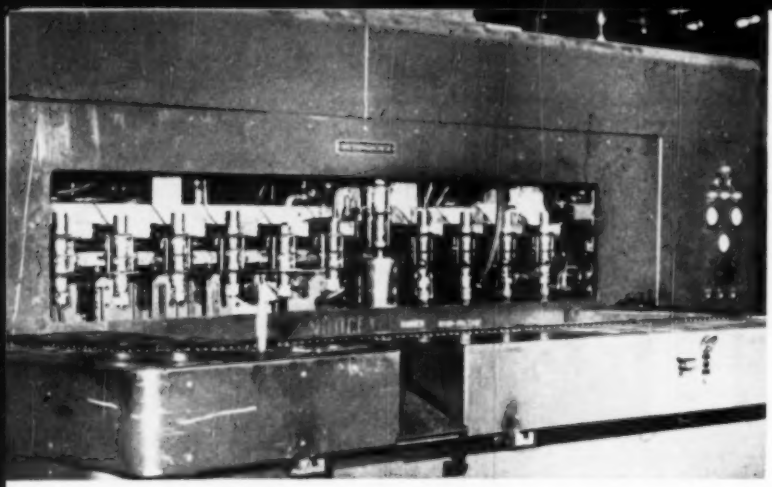
Use of infrared ovens in place of vapor degreasers is reported by several metalworking plants for cleaning sheet metal parts.

Typical operation is the illustrated degreasing of 31-in. x 20-in. sheet metal parts for floor furnaces. Parts are continuously conveyed through an infrared oven that removes all traces of oil in 36 seconds.

Oven consists of two banks of 9 vertically mounted 3.6 kw Chromalox Radiant Heaters. Heated section of oven is approximately 3 ft long and conveyor moves at 5 fpm.

Reduced labor costs, greater efficiency and more uniform degreasing are reported.





THIS COMPLETELY AUTOMATIC WESTINGHOUSE RADIO FREQUENCY HARDENING MACHINE WITH 11 STATIONS IS USED FOR HARDENING 20 DIFFERENT TYPES OF GEARS. PRODUCTION RATES UP TO 800 GEARS PER HOUR HAVE BEEN OBTAINED. THE TECHNIQUES OF HEAT TREATING BY INDUCTION AT INTERNATIONAL HARVESTER'S LOUISVILLE WORKS VARY GREATLY WITH A TOTAL OF 1560 KW POWER FROM 60 TO 450 CYCLES.

Induction Heating Services

International Harvester-Louisville, Ky.

With a total capacity of over 6,000 kw for forging and heat treating shops, International Harvester's Louisville plant is one of the biggest producers of high frequency power for industrial use in the world.

By Norman Cutliff

Electrical Maintenance Foreman
Louisville, Ky. Works
International Harvester Company

EARLY plans for the Louisville Works of International Harvester included a careful study of the possible use of induction heating in the forge shop. A thorough analysis was made of the cost and physical advantages of the conventional method of heating steel for forgings, bending and heat treating, as contrasted with the induction heating method. It was finally decided that induction heating would be used.

However, the use of induction heating was not new to International Harvester. As far back as 1935, the company had used it experimentally on crankshaft bearing surfaces. Subsequent experience was obtained with small gears, shifter rails, and miscellaneous small parts.

Today, the Louisville works is one of the biggest producers of high frequency power for industrial use in the world. Over 6,000 kw in high frequency power, ranging from 60 to 450,000 cycles, is used for heating billet and bar material to forging temperatures and heat treating gears, pinions, splines, cylindrical surfaces, etc.

Forge Shop Planning

The area to be occupied by the forge shop at Louisville Works had previously been a flight hangar. Planning therefore required a basic treatment. An adjoining building was built to house the power generating equipment. Power output requirements were set at approximately 2,500 kw. To produce this, three hydrogen-cooled 1,250 kw, 3,000 cycle, single ph, 800 v, 1,560 amp, 3,600 rpm generators, coupled with 2,300 v, 1,850 hp, 3 ph, 60 cycle motors were installed. These totally enclosed units are operated in parallel.

The necessary allied equipment included a 13,800/2,300 v metal-clad switchgear to house the generator motor starters and protective relays, three generator control cubicles, three separately mounted generator field exciter units, three magnetic air blast high frequency contactors, and three wall mounted parallel manual disconnect cabinets.

Generator Room

The generator building was designed for maximum free air ventilation to facilitate the air-cooled transformer and escape vents for the highly combustible hydrogen gas. Four motor generator foundations were layed (one for possible future expansion).

Fifty-four electrical conduits ranging from ½-in. to 3-in. for all the control and power circuits were embedded in the concrete

INTERNATIONAL'S UNPRECEDENTED RF EQUIPMENT INSTALLATION

Among International Harvester's plans after World War II was the introduction of three low-powered farm tractors, the Farmall Cub, the Farmall Super A, and the Farmall C models.

To build these tractors, the company purchased a plant in Louisville, Kentucky, from the War Assets Administration in 1946. The plant had originally been used for airplane manufacture. Thus its conversion to tractor manufacture immediately presented a host of plant engineering problems.

The purchase price of the plant—plus the great investments the company has made since 1946—have totalled more than $57,000,000—making Louisville Works the largest single investment in the International Harvester Company.

The economy and efficiency of induction heating were utilized to the fullest extent in the new plant in heating for forging, hardening, tempering, brazing, soldering, and shrinking.

The plant now utilizes over 6,000 kw in high frequency power, ranging from 60 cycles to 450,000 cycles.

Forge Shop

The forge shop is equipped with induction heaters, heating approximately 16,000 lb of steel per hour, from 1-in. round to 4¼-in. square in sections. International's metallurgists point out that the advantages of induction heat in the forge shop are:

Increased production. No furnace warm-up or wait for bar heating is required.

Greater die life. Formation of very light scale, as well as uniform temperatures, extends die life measurably.

Reduced material cost. Due to absence of scaling and decarburization, smaller stock sizes and less stock removal in machining may be used.

Improved working conditions. The heating unit is cold to the touch, only the heat piece can radiate.

Heat Treating

The techniques of heat treating by induction vary greatly with a total of 1560 kw power varying from 60 cycles to 450,000 cycles. Choice of frequency, power, quench, hardness pattern, etc., is of extreme importance.

Principal economies result from the use of carbon steels in place of alloy steels, and the elimination of many machine operations resulting from distortion which accompanied previous heat treating methods. In many cases, heat treating costs are lower and quality greatly improved due to lack of distortion and better stress distribution.

Miscellaneous Applications

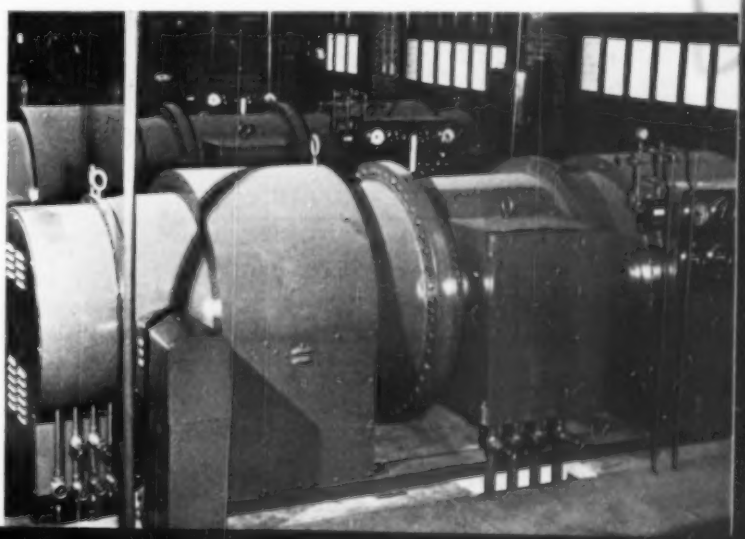
All production brazing and soldering jobs are accomplished by induction heat, producing uniformity of heating, localized heating and rigid heating, all of which contribute to increased quality and economy of operation. Several production shrinking jobs also utilize induction heating.

floor. These electrical conduits were brought up directly beneath the related equipment. A utility service trench is covered with a removable steel floor plate allowing quick access to the lubricating oil supply and drain lines, cooling water supply and drain, compressed air supply lines and the lead covered coaxial high frequency power distribution cables.

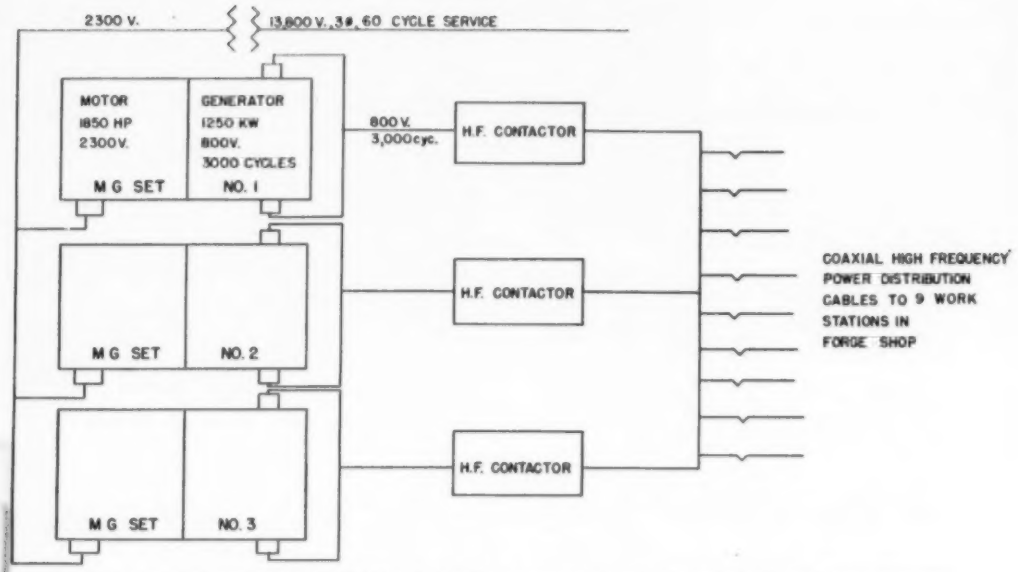
The utilities are carried forward to the work stations in a tunnel that runs the full length of the forge shop (about 300 ft), thence by small laterals ending directly beneath the work stations. At these work stations, steel is heated for forging, bending and forming 108 parts used in tractor manufacturing.

Heat Treating Section

Production schedules established



POWER FOR THE INDUCTION HEATERS IN THE FORGE SHOP IS SUPPLIED BY THESE THREE HYDROGEN COOLED GENERATORS EACH OF 1250 KW CAPACITY. 54 ELECTRICAL CONDUITS FOR ALL CONTROL AND POWER CIRCUITS ARE EMBEDDED IN THE CONCRETE FLOOR. NOTE REMOVABLE STEEL FLOOR PLATES FOR QUICK ACCESS TO THE LUBRICATING OIL SUPPLY AND DRAIN LINES, COOLING WATER SUPPLY AND DRAIN, COMPRESSED AIR LINES, AND THE LEAD COVERED COAXIAL HIGH FREQUENCY POWER DISTRIBUTION CABLES.



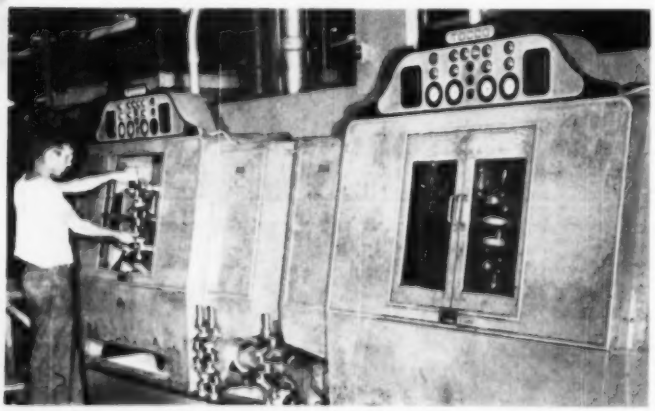
THREE HYDROGEN COOLED 1250 KW, 800 V, 3,000 CYCLE GENERATORS, COUPLED WITH 1850 HP, 2,300 V MOTORS WERE INSTALLED. ALLIED EQUIPMENT INCLUDES A 13,800 V METAL-CLAD SWITCHGEAR, THREE GENERATOR CONTROL CUBICLES, THREE SEPARATELY MOUNTED GENERATOR FIELD EXCITOR UNITS, THREE MAGNETIC AIR BLAST HIGH FREQUENCY CONTACTORS, AND THREE WALL MOUNTED PARALLEL MANUAL DISCONNECT CABINETS.

a requirement of 1,250 kw of 9,000 cycle power and 310 kw of radio frequency power for heat treatment. Due to the large amount of power generating equipment and the necessary allied utilities, a perplexing plant engineering problem developed. The heat treating department had to fall into its proper place in respect to material flow to minimize both the amount of floor area occupied and material handling.

The power generating equipment and the work stations require temperature controlled water, oil, and distilled water. A pit was constructed beneath the area which houses a complete recirculating system consisting of the following: a 3,000 gallon quench oil recirculating tank; a 1,000 gallon cooling water tank; a 1,000 gallon copper distilled cooling water tank; a heat exchanger for each system, and one operating pump and one standby pump for each system. The utilities are carried to the work stations via an under floor distribution trench, covered with removable steel floor plate.

To further conserve floor space, an elevated steel platform, to be occupied by the major portion of the power generating equipment, was erected directly above the work station area. A 200 kw radio frequency generator, five 150 kw, 9,600 cycle alternators and one 500 kw, 9,600 cycle alternator are on the platform. The power is distributed to the work station by lead covered coaxial cables in conduit and parallel bus bars cooled by water running through copper tubing which is brazed to the bus bars. Cooling water for the alternators and distilled cooling water (for the oscillator tubes and the tank section of the 200 kw radio frequency generator) is pumped up to the platform from the recirculating pump pit.

CRANKSHAFT PIN AND MAIN BEARINGS ARE HARDENED BY 9600 CYCLE POWER AT THIS TWO STATION MACHINE IN INTERNATIONAL HARVESTER'S LOUISVILLE PLANT. SEVEN BEARING SURFACES ARE HARDENED SUCCESSIVELY BY AUTOMATIC CONTROL.



Electrical power for all equipment is fed from the plant 13,800 v network system stepped down to 440 v at a 750 kva distribution transformer. Each item of high frequency power generating equipment has its own circuit breaker mounted at the transformer with incorporated over current protection to suit the particular equipment being fed.

The methods of providing the required power and utilities and the planning of the plant layout for induction heating for forging and heat treating installations were original in design.

Operation and Maintenance

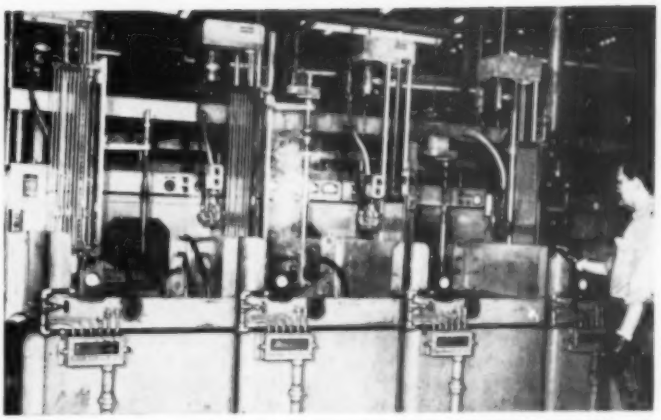
The operation of the work handling stations is a mechanical, repetitious function of merely loading a work piece into the machine, pushing a button, and unloading. The work piece is carried through a complete cycle of preheating, hardening, and quench, all controlled by multi-circuit electrical timers. These machines repeat this process within sufficient time tolerances so that they lend themselves efficiently to time and motion study.

Personnel with electronic experience were selected for repair and maintenance service men. They were assigned to their jobs while the equipment was being installed. This allowed them to develop familiarity with the equipment from the ground up. It also permitted them to draw on the knowledge and experience of the equipment manufacturers' field service engineers who were present until the equipment was approved for production use.

In addition, H. S. Garceau, the plant engineer, gave a six-week course in basic electron theory and its application to induction heating of metals. Service men assigned to the mechanical repair and maintenance of the equipment also attended the course so they could better understand the function and purpose of the equipment. All employees were thoroughly instructed to observe the extremely essential safety precautions necessary when working on or near high frequency power generating equipment.

As in any integrated plant, each machine tool is critical to the continuous flow of material. A carefully planned maintenance program is essential to insure uninterrupted operation. Electricians are stationed at various installations for constant maintenance and to minimize down time.

Production is scheduled to include shutdown periods during which preventive maintenance is performed. Cleanliness in and about equipment of this nature is extremely important because of the high potentials within the electrical circuits. Voltages in the equipment range up to 17,000 v. A system of records is maintained to insure that a schedule is adhered to and that all components of the equipment receive proper treatment.



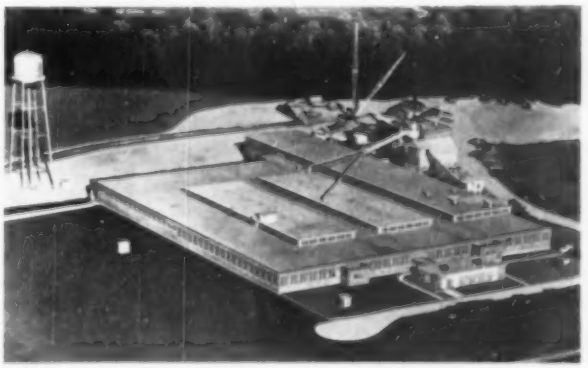
PARTIAL VIEW OF A 12 STATION HARDENING UNIT POWERED BY TWO 150 KW, 9600 CYCLE WATER COOLED GENERATORS. THIS POWER IS MADE AVAILABLE AT ANY OR ALL OF THE INDIVIDUAL STATIONS THROUGH A SWITCHING MECHANISM.

U. S. Plywood Corporation's Orangeburg, S. C., Plant

The new South Carolina plant of the **United States Plywood Corporation** has an annual capacity of about 30 million sq ft of plywood. Modern equipment and smooth flow of materials from log to plywood storage makes this plant one of the most efficient of its type.

The plant's new steam generating unit is believed to be the first **four-fuel boiler** with a fully watercooled dutch oven ever constructed. Designed for firing wood, coal, oil or gas, the unit saved 35 per cent on investment and provides high efficiency and fuel flexibility.

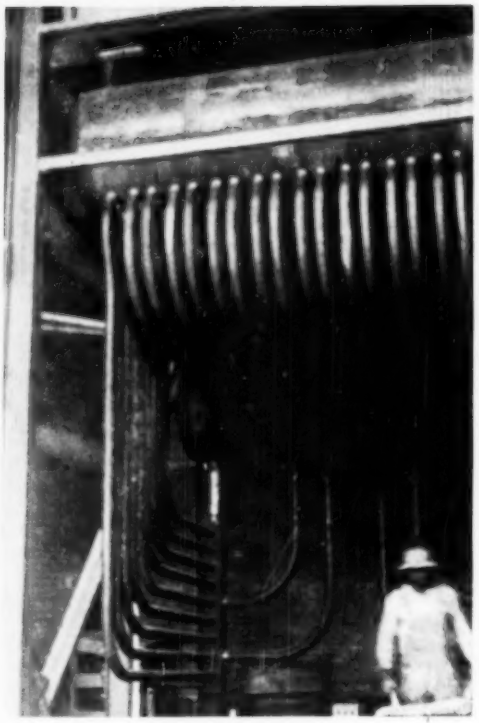
A complete semi-technical description of the plant was featured in the March issue of **Southern Power & Industry.**



Steam From Waste Fuel

Riverside Mills Modernizes Augusta, Georgia Boiler Plant

Burning waste in combination with coal reduces fuel cost, eliminates waste disposal problem, and improves production.



ERECTION VIEW SHOWING ARRANGEMENT OF TURBINE BOILER SIDEWALLS TO ELIMINATE SLAPPING AND REDUCE MAINTENANCE.

THE problem of generating steam efficiently from waste fuel has long challenged the skill of Mechanical Engineers. Where vast quantities of waste fuel such as bark and black liquor in pulp mills, or shavings and saw dust in sawmills are available, the problem is not too difficult. In these instances expensive equipment and thorough engineering can be justified and the potential savings are large. But in smaller plants the solution is more difficult because the firing equipment has to be kept relatively simple and inexpensive to pay off. Nevertheless some rather unique waste fuels such as pecan shells, coffee grounds, and peanut shells have been burned effectively.

This article tells how Riverside Mills in Augusta, Georgia, solved the particular problem of disposing of refuse from cotton waste resulting from their cleaning or willowing process. This refuse is commonly called "motes" and consists of small pieces of cotton and wool highly contaminated with bits of sand, leaves, dirt, and stalks.

Various cotton and oil mills sell their own waste in bales to the Riverside Mills who in turn clean it as far as economics permit by the willowing process. The refuse or motes resulting therefrom creates a nuisance and must be disposed of. In the past various attempts to dispose of it by burning under two HRT boilers gave little success.

Inasmuch as head room in the old boiler room was limited and prohibited overhead storage, waste was shoveled in by hand and inefficiently burned. Most of the steam required for the plant was generated by coal firing two Lombard Iron Works RHT boilers, each 150 hp—using pneumatic type spreader stokers. Coal bills were high and most of the waste motes still had to be hauled away at considerable expense.

Selection of Equipment

Although the idea of utilizing the waste motes as the base fuel had been discussed for several years, development along this line was retarded by the war and it was not until 1946 that samples of the motes were sent to Southern Testing Laboratory in Birmingham, Alabama, for proximate fuel analysis. The analysis showed characteristics quite similar to wood shavings and sawdust except that moisture content was quite low and the potential heat value showed nearly 7000 Btu per pound.

The weight of this material is only about 12 to 13 lb per cu ft as fired, or about ¼ that of coal. This means that the volume fired would have to be about 8 times the volume of 14,000 Btu coal required for equivalent heat. Obviously a larger than normal furnace volume would be required along with adequate grate surface and forced draft fans for under grate air.

After much discussion between Mr. Willard Lewis, President of Riverside, and Mr. Erwin Fleming, Plant Engineer, it was decided to invest in a new boiler plant. Since the source of motes was about 400 ft from the old boiler room and there were numerous obstacles in the way of building a conveyor for the motes, it was decided to build a new boiler room near the source of motes and construct a steam main from it to the main point of distribution in the old boiler room.

Boiler

Following this decision a Babcock & Wilcox, H-Type, Stirling boiler rated at 13,750 lb steam per hour was purchased.

Initial cost per pound of steam delivered is low for this boiler; and due to its tube pattern of 3¼" tubes on 6¾" and 5¼" spacing with cross flow of baffling in 3 passes, a high rate of heat transfer can be obtained with comparatively low draft loss. This design has proven to be very reliable and free from forced outages partly because all generating tubes are connected between drums, thereby eliminating necessity for handhole fittings and headers. Another advantage is its inherent sturdy design which does not require the feedwater to be elaborately treated and carefully controlled to avoid tube failure. Free and easy accessibility to all pressure parts for routine inspection and low maintenance also contributed to its selection.

The boiler selected is designated as H-I No. 18, and is designed for 160 pounds pressure. It is a special design in that water cooled sidewalls were added to the boiler circuit to reduce furnace maintenance and eliminate the slagging which had occurred on the HRT refractory setting.

Firing Equipment

Two chutes feed the waste fuel by gravity from the bottom of a cyclone, located above and in front of the boiler, into the front wall of the furnace at an angle of 60 degrees, and at a point 4 feet above the pin hole grates. Fuel is evenly distributed across the grates by the steam jets indicated in the accompanying sketch. Coal is also burned efficiently by means of an Iron Fireman Pneumatic Spreader Stoker (9 ft wide x 8 ft deep, with 2 feeding nozzles) supplied by Jack Fanning of Atlanta. This equipment offers the advantages of reliability, wide fuel range, accessibility, uniform fuel distribution, shallow fuel bed, and preheated overfire air. In addition, the adaptability of its design permits locating the stoker 15 ft from the front of the boiler and with its hopper in a pit below the boiler room floor to facilitate wheeling in the coal. In addition, 2 cinder return nozzles pick up heavy particles of ash deposited in boiler hoppers at rear of the boiler and return it to the furnace for burning out the remaining carbon present.

Storage Bin

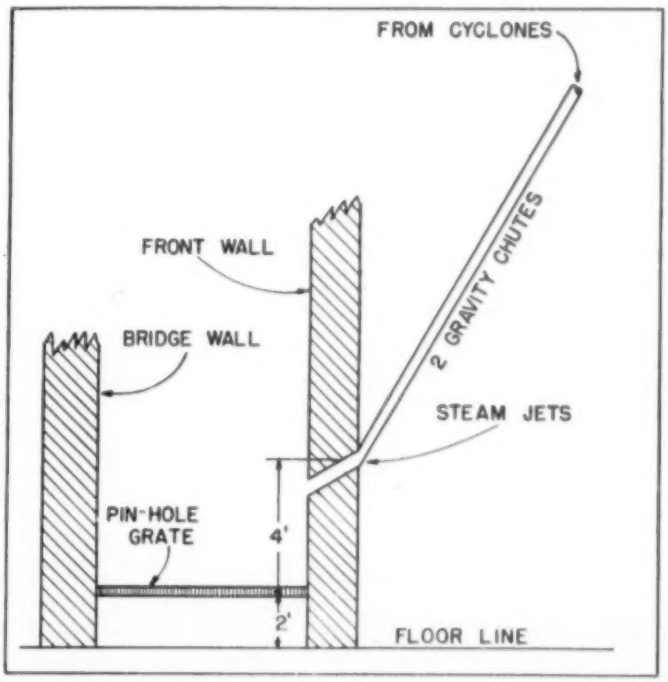
The storage bin for motes is not yet in operation but the Continental Gin Company supplied the feeding equipment inside which are 16 screws, covering the entire floor, which feed laterally from either side toward the center into a moving drag belt, which dumps into the feed pipes.

Due to the irregular flow of motes to the furnace (a condition imposed by the storage bin not yet being in operation) a unique arrangement is employed to carry the steam load with minimum fuel consumption. A pressure of about 100 lb is desired to be maintained. Mercoid switches activated by steam pressure diaphragms cut off the under grate forced draft fan motor drives when the pressure reaches 105 lb. These switches cut on the fan motors when the pressure drops as low as 95 and off again when 100 lb is reached.

Auxiliary Equipment

Originally it was intended that the carryover and flyash be trapped and collected at the bottom of the stack hopper; however, too much flyash was leaving the stack and a centrifugal-type dust collector constructed by the J. J. Finnigan Company was added. This has completely eliminated complaints from this source of nuisance. The stack 36" in diameter by 125' high was also constructed by the J. J. Finnigan Company.

SKETCH SHOWING HOW MOTES ARE FED TO COMBUSTION CHAMBER AND DISTRIBUTED OVER PIN-HOLE GRATES.



Principal Equipment

Modernization Project—Riverside Mills

Augusta, Georgia

Engineering and Construction	The modernization project was planned and executed by the Riverside Mills Engineering Department at the Augusta, Georgia, plant. Work was approved by Mr. Willard Lewis, Sr., owner, and directed by Mr. Erwin Fleming, plant engineer.
Boiler	One—B&W H-Type Stirling Boiler H-I No. 18—Special with water walls, three drum low head type
Stoker	One—Iron Fireman, Pneumatic-Type Spreader Stoker, complete with bin hopper feed.
Boiler Feed Pumps	One—Worthington, Type VC reciprocating steam pump One—Wesco Motor Driven Turbine Pump
Breeching, Stack, and Dust Collector	J. J. Finnigan Company
Meters and Controls	Hays Corporation, A. W. Cash, and Mercoid
Soot Blowers	Diamond Power Specialty Corporation
Brickwork and Insulation	Fisher-Halliday Company
Feedwater Regulator	Copes Type OT—Northern Equipment Company
Feedwater Heater	Patterson—Closed Type
Safety Valves	Consolidated
Blow-off Valves	B&W Angle and Cadman "Gato" Cock in Tandem
Water Columns	Reliance
Steam Gauges	Ashcroft
Piping	Thos. H. Brittingham

The furnace draft is regulated by a Cash No. 90 automatic control operating with hydraulic piston power unit which moves the boiler outlet damper. A Hayes draft gauge is also used for indicating furnace draft and uptake draft. Four Diamond Valve-in-Head soot blowers are used once each shift to keep the tube surfaces clean; and the fires are cleaned twice each shift.

Because a large portion of the steam generated is used in direct heating of various dye vats, the amount of condensate returned to the boiler is small, and a large percentage of city water is used for make-up. Make-up is fed to a float controlled tank along with the available condensate return. Boiler feedwater is pumped by either the normal duplex reciprocating steam pump or an emergency motor driven turbine type pump, through a Patterson closed type multi-pass feedwater heater to the boiler. Heating is obtained by both exhaust from the duplex pump and live steam from the boiler. The live steam is controlled by a Leslie type LTCO regulator which admits live steam to the heater at 15 lb gauge pressure in amounts necessary to maintain the feedwater temperature for which it is adjusted. Correct water level in the boiler is maintained by a Copes regulating valve and a Copes type SL governor on the steam pump. Protection against low water is provided by a Magnetrol which automatically starts the emergency pump if water level drops below a safe level, and also rings an alarm.

Since the percentage of make-up is large, it was found necessary to treat the boiler water to prevent scale and pitting. The system used is that of the National Aluminate Company and frequent samples of boiler water are tested to maintain correct alkalinity, salinity, and zero hardness.

Design and Construction

Plans and specifications were drawn up by the plant engineer. Contracts were let to Claussen-Webster Construction Company for the building construction and boiler foundations; Thos. H. Brittingham for the construction of a 6", welded joint steam main; to J. J. Finnigan Company for erection of a steel stack and breeching; and to Fisher-Halliday Company for boiler brickwork. All electric wiring, boiler auxiliaries, auxiliary piping, and the coal stoker installation, as well as conveying equipment were installed by the Riverside Mills Maintenance Department.

The boiler room has brick walls and a concrete floor. Directly over the boiler, a large hollow tile storage bin with steel roof trusses and steel roofing was constructed. The motes are conveyed from the willowing machines by pneumatic conveyors. A switching arrangement allows delivery from either of two centrifugal separators. One separator is located on top of the storage bin and deposits the motes in the bin, while the other is located above and in front of the boiler and feeds motes directly to the furnace. The screw conveyors, previously mentioned, provide for feeding motes out of the storage bin to the boiler.

Results

Peak loads, estimated as high as 15,000 lb of steam per hour, have been handled; and the fuel savings amount to approximately 3 to 4 tons of coal per day. For the past two years annual fuel savings in the neighborhood of $10,000 have been realized. Furthermore, the expense of removing the waste motes which previously accumulated has now been eliminated, thereby contributing to the attractiveness of the installation. Finally, the unit is reliable and responsive to sudden load changes thereby assisting production throughout the plant.

Handling Unit Loads

By W. G. Hudson

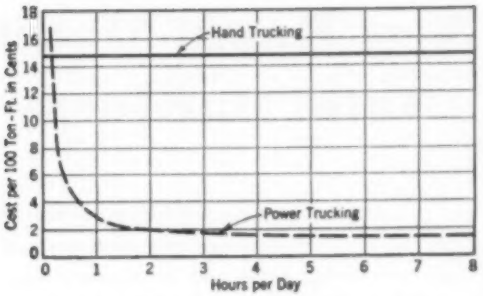


FIG. 1. RELATION BETWEEN HAND-TRUCKING AND POWER-TRUCKING COSTS.

TODAY, costs are a major consideration. We will work through a brief analysis showing how motorized handling compares with manual handling. To arrive at the total cost of operating a truck, we will assume a 2-ton capacity low-lift truck, electrically powered. The investment is shown in Table 1.

We will however take the cost as $1.91 even though the truck works only part time, and the operator's wage at $1 per hour, then we have the figures shown in Table 2.

Hand trucking costs remain substantially the same with increasing volumes until congestion occurs. We will assume a basis of 3½ tons per hour, and the laborer's wage at 50 cents per hour, giving 14.3 cents per ton. Then we get the comparison shown in Table 3.

Fig. 1 shows the comparative costs per 100 Ton Feet along the lines developed above. Of course trucking costs are intimately connected with the skill of the available personnel, and vary widely. So, the costs arrived at may have to be discounted; but there are actual instances in which they have been bettered. Moreover there are related savings from the even flow of materials: less time lost by the skilled machine operators and production machines, and less congestion in the production and storage areas. With high-lift trucks material may be tiered up to 12 feet or higher. Where the items involved in unloading from, or loaded to cars or motor trucks are bulky and heavy (Fig. 2), mechanized handling has shown fewer accidents, lower compensation payments, and minimum damage to shipments.

Table 1—Investment Costs

Net price of truck	$2000
Cost of one set tires	100
Depreciation basis	1900
Depreciation: 6% of $1900	$123.50
Annual tire cost	100.00
Net price of battery $450. 16½%	74.25
Cost of charging equipment $600. Depr. 5%	30.00
Maintenance of truck	80.00
Maintenance of battery	30.00
Maintenance of charging equipment	10.00
Charging current	40.00
Insurance	10.00
Total per year	$497.75
Total per 8-hr day, at 260 days per year	$ 1.91

Table 2—Power Trucking Cost

Hours per Day	Total Trips Made	Tons Handled	Cost of Truck	Cost of Wages	Total per Day	Cost per 100 T. Ft.
½	26	52	$1.91	$.50	$2.41	4.65 cts.
1	53	106	1.91	1.00	2.91	2.75
2	106	212	1.91	2.00	3.91	1.84
4	212	424	1.91	4.00	5.91	1.40

Table 3—Comparison of Hand and Power Trucking

Hours per Day	Tons Handled	Power-Trucking Cost	Hand-Trucking Cost	Annual Savings	Per Cent Return
½	52	$2.41	$7.45	$ 360	12
1	106	2.91	15.16	3,180	104
2	212	3.91	30.32	6,870	225
4	424	5.91	54.73	14,900	488

New Rapid Method for Determining Total Hardness Content of Water

This new, highly accurate, rapid procedure for determining the calcium, magnesium and total hardness content of water is expected to replace the soap method now widely used.

By R. F. Willey
Chief Chemist
and
D. R. Senger
Research Chemist
Elgin Softener Corporation

FOR years total hardness in water has been determined by the soap method. This method has had the advantage of simplicity and usable accuracy wtih a high degree of speed over the accepted and time-consuming gravimetric procedures. However, the soap method has always been subject to certain interferences as well as the "personal" factor which can give inaccurate results.

A new method is now available for total hardness determination in waters, which is faster and more accurate than the soap method, and is as simple to run as is an alkalinity titration. The method was first reported by Schwarzenbach *et al*, in *Helvetica Chemica Acta* as part of a brilliant series of investigations of the complex ions of the alkaline earths with amino polycarboxylic acids. A dye, which gives a sharp color change at the end point, is used as an indicator. The new procedure has been found to be superior to the soap method in all respects.

The Schwarzenbach titration for total hardness uses the sequestering properties of disodium dihydrogen ethylene diamine tetra acetate. This material is marketed by some manufacturers under the name of versene; thus this hardness titration is sometimes referred to as the "Versenate Method". The end point of this volumetric method is determined by use of a dye known as Erio-chrome-schwartz T, which at pH 10 forms a wine red complex in the presence of calcium and magnesium, and changes to blue in their absence. Thus, when the calcium and magnesium are removed from the ionic state by reaction with the disodium dihydrogen versenate, the red color changes to grey or blue, indicating that the end point has been reached. In this way total hardness is determined rapidly with an average accuracy of ±1% on waters of normal hardness. Greater accuracy can be obtained on low hardness waters by using larger samples, and conversely those waters containing very large amounts of calcium and magnesium are best titrated when using a reduced sample size or increased strength of standard versenate solution.

Interferences

As might be expected, this new method, as originally reported, was found to be subject to certain interferences which occurred most frequently from the divalent metal ions. Fortunately most of these are rarely encountered in natural water supplies. Certain ones, however, made it necessary to carry out special research to find a means of overcoming their effects.

For example, manganese is occasionally found in natural water supplies, and when present causes the above-mentioned indicator to fade and change color, thus obscuring the end point. Another example is copper, which inhibits any color change whatsoever. Sufficient copper to cause this interference can be picked up by water which has passed through only a few feet of copper piping.

However, newly developed, modified indicators have overcome these difficulties, and all that is now necessary is to use the proper indicator, ManVer if manganese is present or CuVer if manganese is absent. A different kind of interference is caused by iron, which when present in considerable quantity causes peculiar color development and some hindrance. Ferrous iron is especially troublesome in this respect. Therefore, when iron interferes (several ppm) it should be oxidized and filtered off before making the hardness determination. The polyphosphates have a sequestering interference all their own, and gradually release hardness after titration with versenate is supposedly complete. Heating the sample to convert the polyphosphates to orthophosphate is the usual procedure for overcoming this interference. Other ions which are capable of interfering, but rarely encountered, are nickel, cobalt, mercury, cadmium and zinc.

Procedure

The procedure for determining total hardness is quite simple. A 58.3 ml sample is placed in a 250 ml Erlenmeyer flask, and to it is added 1 ml of buffer solution and 3-5 drops of CuVer or ManVer indicator. Titration is accomplished by adding standard versenate solution from a burette to that point at which **all** red color is discharged. Care should be exercised in the titration because the color change

TABLE I

ACTUALLY PRESENT (G.P.G.) (GRAVIMETRIC METHOD			VERSENATE METHOD			SOAP METHOD		
Ca	Mg	Total	Ca (By Diff)	Mg	Total	Ca (W*)	Mg (By Diff)	Total
2.8	3.0	5.8	2.7	3.1	5.8	2.8	3.2	6.0
9.5	9.8	19.3	9.6	9.7	19.3	9.6	10.8	20.4
14.3	14.9	29.2	14.2	15.0	29.2	14.4	14.6	29.0
21.5	22.3	43.8	22.0	21.9	43.9	22.0	23.0	45.0
28.6	29.8	58.4	29.2	29.4	58.6	28.0	31.0	59.0

TABLE II

DEVIATION FROM ACTUAL HARDNESS USING VERSENATE METHOD

Ca GPG	Mg GPG	Total GPG
—0.1	+0.1	0
+0.1	—0.1	0
—0.1	+0.1	0
+0.5	—0.4	+0.1
+0.6	—0.4	+0.2

TABLE III

DEVIATION FROM ACTUAL HARDNESS USING SOAP METHOD

Ca GPG	Mg GPG	Total GPG
0	+0.2	+0.2
+0.1	+1.0	+1.1
+0.1	—0.3	—0.2
+0.5	+0.7	+1.2
—0.6	+1.2	+0.6

*Calcium determined by Winkler Modification Soap Method.

TABLE IV

TIME CONSUMED PER DETERMINATION (Averages)

Gravimetric Method	Versenate Method	Soap Method
30 min.	3 min.	14 min.

AS INDICATED IN THESE TABLES, ACCURACY AND TIME SAVING ARE IMPORTANT FEATURES OBTAINABLE WITH THE NEW VERSENATE METHOD FOR DETERMINING HARDNESS IN WATER.

is somewhat slow and quite sensitive. For this reason it is desirable to add the versenate slowly to prevent over-running the end point. Since the standard versenate is adjusted so that 1 ml is equivalent to 1 mg of $CaCO_3$, the burette reading will be directly in gpg as $CaCO_3$. Should it be desired to obtain results in ppm, a 50 ml sample can be used and the ml of versenate consumed multiplied by 20.

Magnesium is determined by precipitating the calcium as the oxalate, filtering and running the hardness titration on the filtrate. The calcium content is then obtained by subtracting the magnesium from the total hardness.

Accuracy of Method

The Versenate Method has been in use in the laboratories of the authors for the past year and results have been noteworthy. In their opinion, this method will soon become accepted as the standard, replacing the soap method in nearly all places where it has been used in past years. As indicated in tables I through IV, accuracy and time saving are both important features obtainable with the new procedure.

The adaptation of the Schwarzenbach Titration method of determining hardness in water is now completely developed and perfected to the point where it has been made simple, accurate and fully reliable for use in industrial and municipal plants and laboratories. Standard solutions, indicators, reagents and full directions for making the analyses are now available.

World's Largest Pumps

The world's largest pumps for the Grand Coulee Dam were designed by the Byron Jackson Co. and The Pelton Water Wheel Company. Six of the 12 gigantic pumps are now ready for installation. With all 12 units in operation, approximately one million acres of land can be irrigated.

Suction elbows of the pumps are 14 ft in diameter. The combined capacity of the 12 units can be demonstrated by comparison with Niagara Falls.

The American Falls are estimated to average some 5½ million gpm. The combined capacity of the Grand Coulee Pumps is 8,640,000 gpm. The comparison of lift versus drop is also interesting; Niagara has an average drop of 160 ft; the Grand Coulee pumps will be called upon to deliver water to a point some 300 ft above intake. To do this job, each pump reuires 65,000 hp, or a total of 780,000 hp for the 12 pumping units.

New Dust Collectors Applied To Old Boilers

By Harold Hansen

Assistant Superintendent of Power
Champion Paper and Fibre Co.
Canton, North Carolina

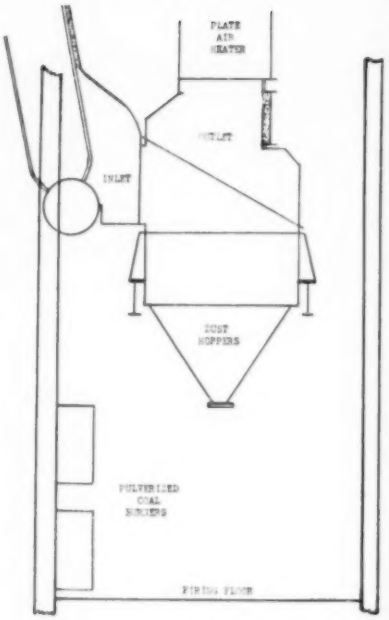
Application of dust collectors to boilers installed in 1928 presented serious space problems that were solved by Champion's engineers.

POST war expansion in production facilities at The Champion Paper & Fibre Company's plant at Canton, N. C., increased the demand for steam and power services beyond the capacity of the existing power plant to render uninterrupted service. Therefore, the decision was made to increase both the steam and power generating capacity by the installation of additional equipment. The original high pressure boiler plant was built in 1928 and 1929, and the boilers were among the first high pressure, large capacity boilers to be installed in an industrial power plant. No provision was made to collect the fly ash as the problem at that time had yet to be recognized and only limited equipment was available for the purpose.

Mindful of its responsibilities, when the decision was made in 1945 to install another boiler, Champion management insisted that provision be made in the design to include dust collectors to reduce the fly ash from the stack. Space inside the building for the new 300,000 lb per hr Riley steam generator was limited, so supporting steel was projected through the roof to support the Buell dust collector above the roof level. The dust hoppers are below the roof line allowing the dust valves to be operated within the building. The results were satisfactory.

Collectors for Older Boilers

About a year and a half ago it was decided to proceed with the program of installing dust collectors on the two older boilers. Many problems were faced. The induced draft fans were located on the top floor in the boiler room above the boilers. To install the collectors out of doors on the roof would require strengthening the supporting steel from the foundations and the maze of duct work from the air heater outlet below the induced draft fans, to the collectors on the roof and back to the induced draft fans would obstruct other equipment and make operation difficult. Each possibility was explored. Valuable information and advice was given by the several manufacturers of dust collecting equipment.

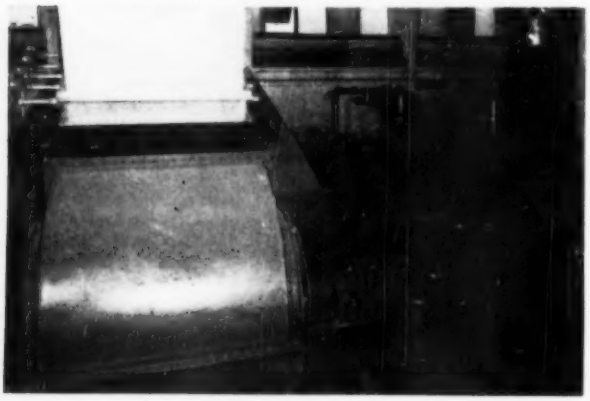


LOCATION OF THE NEW CYCLONE COLLECTOR IN THE PATH OF THE GAS BETWEEN ECONOMIZER DRUM AND AIR HEATER GAS INLET.

The decision was finally made to install the collectors between the boiler outlet and the air heater inlet in the space used for dust hoppers in the original design. These older boilers are 300,000 lb per hr Heine bent tube boilers having integral economizers. The gases leave the boiler sweeping over the 36-in. diameter lower economizer drum after having come downward around the economizer tubes.

The location of the inlet to the air heater with respect to the 36-in. economizer drum was different on

GENERAL VIEW SHOWING FANS AND DRIVES.



Principal Equipment

2—Dust collectors ..... 9VG12—300-10 multi cyclone by Western Precipitation Corp.

2—Induced draft fans ..... 247,000 cfm; 440 F; 12.4 in. static head; 570 rpm; 2700 ft altitude; with inlet dampers and ½ inch liners. American Blower Corp.

2—Variable speed I.D. fan drives.... Hydraulic coupling size 48 type VS American Blower Corp.

2—Motors ..... 800 horsepower; 590 rpm; 2300 volt, water cooled induction motors. General Electric Co.

7—Dust valves and dust pipings.... 4" Windswept valves, 4" Ashvolite pipe to present hydrovactor, Allen Sherman Hoff Co.

Duct work ..... Mecklenburg Iron Works.

the two boilers. On one unit the air heater flange was 3 ft above the center line of the drum while on the other it was 7 ft 6 in. The horizontal dimensions were closer: the distance from the drum center line to the air heater center line being 8 ft 2½ in. and 8 ft 6¾ in., respectively. It will be noticed that the lesser dimensions in both directions were on the same unit. The dust collectors have the gas entering horizontally and leaving in a vertical direction.

The distance from the inlet flange to the center line of the collector outlet flange is 4 ft 8¾ in. The width of the inlet box between the 36-in. drum and the collector inlet is 22 in. on one unit and nearly 27 in. on the other. The Western Precipitation Multi Cyclone collectors which were selected fitted the space available better than any other unit offered.

The air ducts from the air heater outlet to the pulverized coal burner boxes had to be redesigned to permit the installation of the collectors. The same velocity that previously existed was obtained by altering the shape of the ducts—but not the cross-sectional area. Turning vanes were used where changes in the air flow were more abrupt than in the original design.

The collectors are supported by steel framing that was connected to the building steel. The load imposed was but little more than that previously applied by the dust hoppers which were lined with fire brick.

The job required working in close places and careful rigging to install the collectors. Openings had to be made in the boiler house walls to get the parts into place. The dust hoppers are bolted to the collector bottom, but all other parts of the collectors are supported on the steel framing. Since all parts had to be moved into place from below, it was necessary to hoist into positions above the final location, all parts of the collector and duct work, install the supporting steel, and then lower into position the parts of the dust collector and duct work. Both welded and bolted joints were used. Asbestos tape gaskets were used on all bolted joints. Provision was made for expansion by use of slip joints or expansion joints.

One of the collectors was insulated with Super X block next to the metal covered with 85% magnesia block. Poultry netting was then applied and covered with ¼-in. insulating cement and ¼-in. insulating finishing cement. The insulation of this unit was done under contract by Reed-Hayden Co., Charlotte, N. C.

The other unit was insulated by wiring on 3-in. Kalo blocks. Poultry netting was then applied and insulation cement was applied as on the first unit. This work was done by the company's own insulation crew. The second unit required considerably less labor for applying the insulation. As far as heat transmission is concerned both give comparable results.

Except for the insulation on one unit all work was done by the company's maintenance crews. The engineering work was also done by the company's engineers, but as mentioned previously valuable aid was given by the manufacturers' representatives and engineers.

Initial operation and preliminary tests indicate that performance is well above expectations.

Air Conditioning Compressors for U. S. Time, Abilene, Texas

These are Frigidaire water cooled reciprocating compressors with approximately 75 tons of refrigeration capacity for air conditioning in the new **United States Time Corporation** plant in **Abilene, Texas.** Three 25 hp electric motors power six Frigidaire compressors.

Equipment is housed in a special penthouse with dimensions of about 20 x 60 ft. Shown looking over the compressor arrangement are **J. E. Kuykendahl,** left, general sales manager of the **West Texas Utilities Company,** which made the installation, and **F. J. Orintas, U. S. Time Corporation** plant manager.

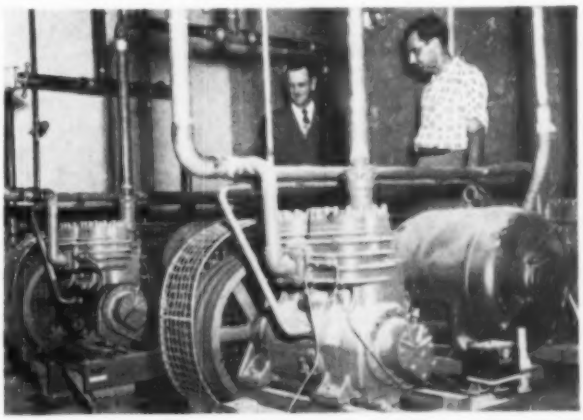


FIG. 1. MAGNETIC HUMP TYPE PERMANENT MAGNETIC SEPARATOR, CONSISTING OF TWO STRONG PERMANENT MAGNETS INSTALLED IN A RECTANGULAR STEEL HOUSING, IS DESIGNED FOR USE IN AIR LINES AND GRAVITY FLOW DROPS.

Versatile Permanent Magnets

Magnetic Plate, Hump, and Drum Type Separators

By
Francis A. Westbrook

PERMANENT magnets for the separation of tramp iron from food products before processing and packaging have a very wide application in the preparation of grains and cereals, nuts, canning and preserving, meat packaging, and on vegetable dehydrating lines.

Obviously, the removal of tramp iron in the form of nails, screws, bits of wire, etc., is necessary for the protection of the consumer and also the processing machinery. Costly repairs, loss of production time, and loss of wages may be greatly reduced.

Advantages

Magnets of the permanent type are largely employed for such work. They have the great advantage of not requiring any electric wiring and are therefore comparatively simple and inexpensive to install. They do not get hot from excessive current, and are not affected by water, wet materials, etc. Their service cannot be interrupted, nor are there operating or maintenance costs.

Types Available

Permanent magnet separators are very versatile in that they may be installed in various ways to meet different conditions. They are supplied in three forms, each of which can be varied as to design and method of installation.

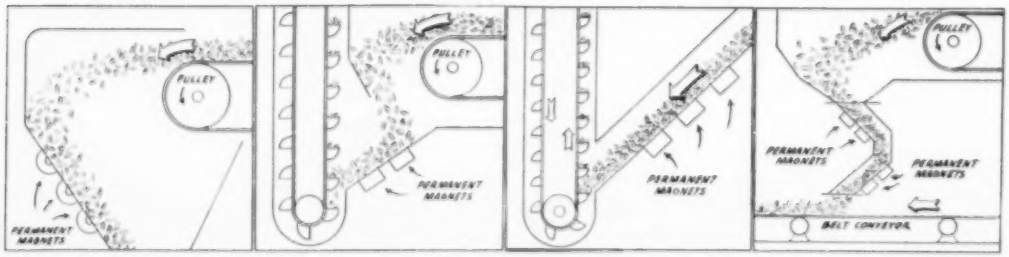
1. **Magnetic plate separators,** which may be mounted above or below flows of material, at the bottom of gravity chutes, etc.

2. **Magnetic hump,** designed for use in air lines and gravity flow drops, and consisting of two strong permanent magnets installed in a rectangular steel housing (Fig. 1.)

3. **Drum type magnetic separator,** which is also used to catch tramp iron in chutes and spouts, especially where the pieces are comparatively small.

Permanent magnet pulleys are also used under certain conditions. How these different types are used in up-to-date plants can best be explained by considering some specific applications for different service conditions.

FIG. 2. DIFFERENT METHODS OF INSTALLING PERMANENT MAGNETS IN GRAIN ELEVATORS AT THE DISCHARGE POINT OF THE BELT CONVEYOR TO THE BUCKET ELEVATOR. AT THE LEFT, THEY ARE PLACED IN THE HOPPER BELOW THE BACKBOARD WHERE THE GRAIN STRIKES AND SLIDES DOWN TO THE ELEVATOR. IN THE SECOND AND THIRD SKETCHES, MAGNETS ARE ON THE LOWER SIDE OF THE SPOUT LEADING TO THE ELEVATOR. THE FOURTH SKETCH IS THE VERTICAL MAGNETIC HUMP, WHICH IS BOTH SIMPLE AND EFFICIENT. DISCHARGE MAY BE TO ANOTHER BELT CONVEYOR, OR DIRECTLY INTO A CHUTE, LEADING TO THE BUCKET ELEVATOR.



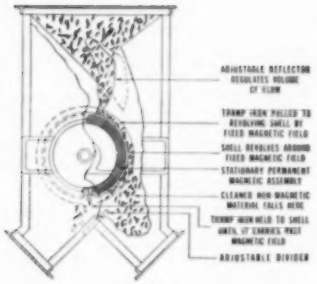


FIG. 3. HERE'S HOW THE MAGNETIC DRUM SEPARATOR WORKS. IT IS WIDELY EMPLOYED AHEAD OF THE FINAL BAGGING OR PACKAGING TO ASSURE PURITY OF THE PRODUCT.

Plate Magnets

In the field of grains and cereals, as well as for tea, coffee, and spices, plate magnets are employed very extensively in the initial grinding processes. They are installed in gravity flow chutes, on hammermill feed tables and in attrition mills to prevent tramp iron from entering the machinery, possibly causing sparks and fires, or explosions, in addition to mechanical damage. At subsequent points in processing, the magnets may be suspended above conveyor lines to remove such items as staples, nails, spikes, parts of machinery, etc.

Installation of plate magnets at a large terminal grain elevator is seen in Fig. 4. It is located at the discharge end of the belt conveyor which delivers grain to the bucket elevator and where it flows at uniform speed and depth. Cleaning of the magnet is simple at this location and the tramp iron is removed before it can be the cause of a fire or explosion. One double row magnet is installed immediately under the point where the grain strikes the backboard and another at the bottom of the backboard in front of the elevator in a vertical magnetic hump. Both magnets are thus located where the direction of flow is changed and where there is a momentary pause.

The average amount of tramp iron removed by the two magnets is 15 pounds per week, and tests have indicated that this amounts to 95 to 100 per cent of all that is present. The conveyor belt employed here is 40 in. wide, travels at 650 fpm and the depth of the grain and soft feeds handled by it is from 2 to 4 in. This gives a good idea of what the magnets can do.

Magnetic Hump

The magnetic hump is also used in the milling industry and is especially applicable where gravity

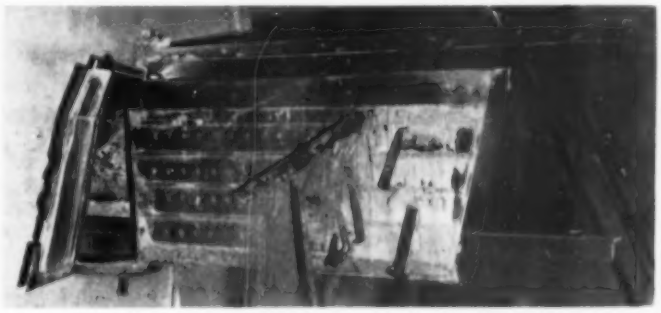


FIG. 4. INSTALLATION OF PLATE MAGNETS AT A TERMINAL GRAIN ELEVATOR. HIGHER MAGNET HAS BEEN PLACED ON TRUCKS TO FACILITATE CLEANING WITH A MAGNET RAKE.

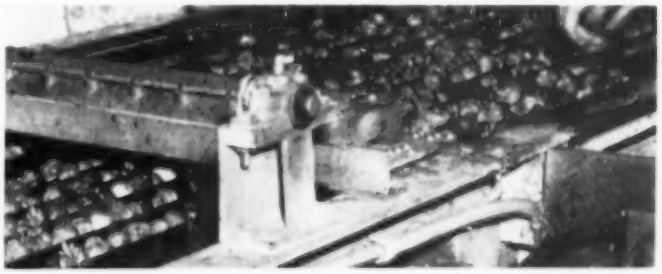
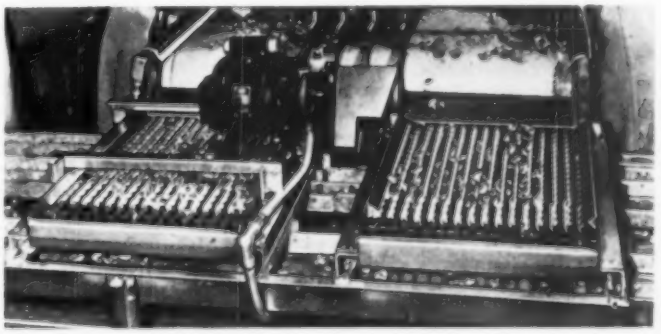


FIG. 5. THIS PLATE MAGNET, INSTALLED OVER A CONVEYOR FOR SORTING STRAWBERRIES FOR QUICK FREEZING, PICKS UP PIECES OF WIRE, TACKS, BASKET CLIPS, TOOLS, BOTTLE CAPS, ETC. NOTE SIMPLICITY OF INSTALLATION.

IN FIG. 6., BELOW, A MAGNETIC DRUM MAGNET IS USED AT THE END OF A CONVEYOR HANDLING DEHYDRATED VEGETABLES. FIG. 7., RIGHT, SHOWS HOW A MAGNETIC PULLEY IS EMPLOYED IN THE PROCESSING OF NUTS.



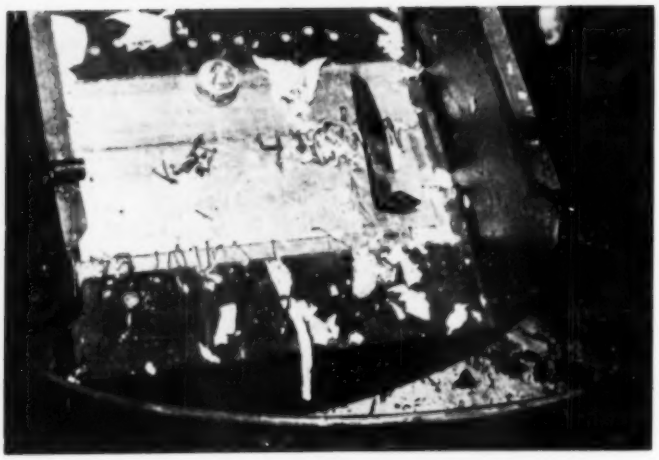


FIG. 8. PLATE MAGNETS HAVE GIVEN EXCELLENT RESULTS IN GELATINE PROCESSING LINES IN WHICH THE LARGE AMOUNT OF TRAMP IRON STOPPED BY ONE OF THESE UNITS IS CLEARLY SEEN.

flow is employed. The material enters at one end of the hump (see Fig. 1.) and impinges on the first magnetic plate. It then changes direction, passes around the hump, and impinges against a second magnetic plate and again changes direction. For gravity flow of material the hump unit would be placed in a vertical position. The feed may be by belt conveyor or by any other convenient means.

Magnetic Drum

When the initial grinding has been completed and the grain is being further processed, other magnetic units are used. The magnetic drum is widely employed ahead of the final bagging or packaging to assure the purity of the product reaching the ultimate consumer. A general purpose drum separator consists of a stainless steel revolving cylinder surrounding an eccentrically placed high power stationary non-electric permanent magnet. A feeder regulates the flow of material into the hopper where it falls on to the revolving drum. Tramp iron is attracted to the drum and sticks to it until it passes out of the magnetic field and drops into a receptacle. (See Fig. 3.) The cleaned material passes out through one chute and the iron through another.

The magnetic drum is generally used where grain, tobacco, plastics, ceramic sands, powders, chemicals, crumb rubber, etc., are conveyed in chutes, spouts, and similar systems not employing belts. They are available in various drum diameters and with various housings to suit particular needs.

Magnetic Pulleys

Magnetic pulleys are frequently used in milling operations when the materials to be cleaned are handled by belt conveyors. Such pulleys have been found very effective for removing tramp iron from bulk materials like cocoa beans, coffee, spices, roots, grains, rice, nuts, sugar, etc. They may be used as head pulleys on receiving belts and at the end of picking and sorting tables.

Permanent non-electric magnets are also used extensively for the protection of the consumers and processing machinery in connection with the preparation of preserves. Plate magnets, magnetic pulleys, and magnetic traps for liquid pipe lines are employed for this class of material. It is worth bearing in mind that a great many food and other products are processed in several stages. For example a baker uses previously processed items like sugar, flour, fruits, flavors, extracts, etc. and it is necessary to protect the machinery in each step against damage by tramp iron, as well as the consumer who receives the end products. Many of the individual items are processed several times. In other words, so many steps are often involved where tramp iron can get in, that great care must be exercised to make sure that it is removed, frequently by the insertion of magnets at three or four points.

Natural Gas Pipe Lines

Almost 38,000 miles of pipe lines were laid in 1949 compared to the 9,700 miles of pipe laid in the United States in 1948. Of this total 20,750 miles were for natural gas lines similar to this 26" pipe being laid in Louisiana by the Tennessee Gas Company. It is estimated that a capital expenditure of one billion dollars will be required to accomplish the nation's natural gas pipe line program.

Feedwater Analysis and Treatment

A Study Course for Power Plant Chemists and Operators

This is the third article of a four part series of questions and answers. Part one appeared in February and part two in March. The informtion presented here was originally prepared to help the men in the plants of Florida Power Corporation better understand the need for and effect of feedwater analysis and treatment procedures which have been adopted by that company.

By R. B. Lee

Production Engineer
Florida Power Corporation
St. Petersburg, Florida

. . . . PART THREE . . . .

45—Why is it necessary to keep the total concentration of solids in the evaporator shell below a predetermined value?

It is known that high concentration of solids in water will cause carry-over from an evaporator as well as a boiler. The purpose of the evaporator is to give pure water for makeup, so the concentration must be kept below a predetermined value to prevent an appreciable amount of solids from going over with the steam.

46—With a water containing 100 ppm of sodium chloride and an evaporator holding 1000 gallons, what concentration would be in the shell water if the evaporator were operated at an output of 700 gallons per hour for six hours?

The water in the evaporator contains 100 ppm sodium chloride at the start. Each additional 1000 gallons supplied to the evaporator increases the chloride concentration by 100 ppm. (This assumes that the carry-over is negligible). In six hours at 700 gallons output, a total of 4200 gallons would be evaporated. Therefore:

$(4200 \div 1000) \times 100 = 420$ ppm added.

Since the evaporator contained 100 ppm, the total sodium chloride concentration without blowdown $= 100 + 420 = 520$ ppm.

47—Why is a continuous blow-down pipe extending $\frac{2}{3}$ the length of the boiler drum used instead of a plain opening without any extension into the drum?

The solids in boiler water are not evenly distributed. A perforated pipe which allows water to be blown from the greater portion of the drum will give a better chance of evenly lowering the concentration in all of the water.

48—What is the approximate location of the continuous blow-down pipe in relationship to normal water level? Why?

The continuous blowdown pipe is usually located a few inches below normal water level. Highest concentration of solids is normally at the top of the water due to the action of the steam bubbles carrying the solids to the top. The blowdown taken from near the top will, therefore, contain a higher concentration than if the blowdown pipe were located at a lower point.

49—Where does the majority of the CO_2 come from that is found in the evaporator vapor?

Most natural waters contain temporary hardness (bicarbonates). Calcium bicarbonate has a formula $Ca(HCO_3)_2$. When subjected to heat, a bicarbonate breaks down to form a carbonate, water and CO_2 gas. Most of the CO_2 gas in evaporator vapor is from this source. Some waters contain organic matter which also liberates CO_2.

50—What will be the result on the phenolthalein and methyl orange alkalinities if a sample of steam condensate having a pH value of 6.5 is exposed to the atmosphere for a length of time?

A sample of condensate having a pH of 6.5 exposed to the atmosphere can either absorb or release CO_2 depending upon atmospheric conditions in respect to temperature and composition of the air. If CO_2 is absorbed, the pH will decrease and will also decrease the P and MO alkalinities. If CO_2 is expelled or released, the pH will increase and the alkalinity may remain the same or undergo a slight change which would be difficult to determine with the regular titration method.

51—Why is it necessary to use cooling coils to take samples for analyzing, even on turbine condensate?

Cooling coils are required on steam samples to condense them. On hot water near or above the boiling temperature at atmospheric pressure, some of the water would flash to steam, giving a sample of higher concentration than actually exists. For any samples to be checked for oxygen content, the water should be cooled below room temperature.

Since samples for all tests should be at room temperature before tests are made, considerable time is saved with cooling coils.

52—Why should pyrex bottles instead of plain glass be used for obtaining samples for the majority of the tests? Why rubber or plastic for silica test?

Pyrex bottles are not as easy to break as plain glass. They do not contain as many impurities. Silica free hard rubber or plastic bottles are used for collecting samples for the silica test to eliminate any possibility of the samples dissolving any silicate from glass in case there is a delay in testing for silica after sample is taken.

53—Why is a chemical containing chlorine put in the condenser circulating water?

Chlorine and chlorine compounds are used to kill bacteria or algae, that will form slime growths in the condenser. It is also claimed that it gives some control of marine growths.

54—What is the relation of phenolthalein and methyl orange alkalinities in the presence of bicarbonates, carbonates and hydrates?

If P alkalinity is less than ½ M alkalinity, bicarbonates are present to the amount of M-2P. If P is equal or greater than ½ M, no bicarbonates are present. If P is equal to or less than M, the amount of carbonates is 2P. If P is greater than ½ M, the amount of carbonates equals 2 (M-P) unless P = M, then there are no carbonates.

There are no hydrates present unless P is greater than ½ M. The hydrates are equal to 2P-M unless P = M, then M gives amount of hydrates. (See page 25, "Why Water for Steam Boilers Should Be Treated and Analyzed", by S. M. Sperry).

55—In our system, why is P alkalinity maintained greater than ½ MO alkalinity and what chemical is present in the water due to this relationship?

Since P alkalinity must be greater than ½ M alkalinity for no bicarbonates to be present, and since bicarbonates will form CO_2 when subjected to heat, limits on P alkalinity are put above ½ M so that no bicarbonates are present. With P greater than ½ M, hydrates are present.

56—Why is a concentrated solution of sodium chloride used to regenerate a zeolite (green sand) softener and why is it necessary to back wash it after regeneration?

In the use of zeolite (generally sodium zeolite) for softening water, the sodium replaces the calcium or magnesium in the water and eliminates the soap consuming or hardness properties of the water. The sodium zeolite is changed to calcium or magnesium zeolite. After this cycle has used most of the sodium in the zeolite bed, a backwash of clean water eliminates any foreign matter left by the raw water. By passing a strong solution of salt (sodium chloride) through bed, the calcium and magnesium zeolite is changed to sodium zeolite. Clean water is again passed through the zeolite to force the brine through the zeolite thoroughly, to wash out any excess brine and to eliminate the resulting calcium and magnesium chloride.

57—Why should the boiler be blown down occasionally with the main blow-down valves even though a continuous blowdown arrangement is available?

The main boiler drum blowdown valves should be used periodically to: (1) Eliminate any solids collected at bottom of drum; (2) Check on condition of valve.

58—What causes turbidity in water? How is it eliminated in boiler water?

Turbidity in water is caused by suspended matter in finely divided state. It is eliminated by blowdown.

59—What substances compose the total solids as determined by analysis of a sample of boiler water?

The substances composing the solids in boiler water determined by our standard tests are carbonates, hydrates, sulphates, and chlorides. The other solids are taken into account in the solids factor supplied by our professional testing laboratory.

60—Why is it recommended to filter the sample before making the test for silica concentration?

A sample for silica test is filtered to remove any interference in color from suspended matter.

61—Why should the drains from the intercondenser after the air ejector be piped into the condenser and not the hotwell?

The air ejector eliminates most of the gases from the steam in the condenser. Some steam is pulled with these gases. As soon as part of this steam is condensed in the intercondenser, it absorbs some of the gases. If this drain is put into the hot well, these gases are returned to the system. If it is returned to the condenser above the takeoff to the air ejector, the water is heated by the steam in the condenser, freeing the gases which are again subjected to the action of the air ejectors.

62—Why is it sometimes necessary to dump the drains from the after condenser of the air ejector?

The after condenser drains contain more gases than

the intercondenser drains. If the system contains ammonia, a large percentage will be in these drains and the best way to eliminate it from the system is to dump it.

63—When a boiler is blown down with the main blow-down valves, why is it better to do this at low boiler output than at high load?

It is better to use the main blowdown valves at low load because:

(1) This major blowdown might affect water circulation in boiler.

(2) The feedwater regulator will try to return the level to normal by putting in a large amount of relatively cold water. This will affect steaming rate more at high loads.

(3) Concentration in blowdown will be higher due to smaller amount of steam bubbles being formed to carry solids to top of water.

64—Under what conditions can boiler water wall headers be blown down?

Boiler water wall headers can be blown down only when there is very little circulation in them. Water wall headers should not be blown when boiler is steaming.

65—What is the boiler manufacturers' usual guarantee on solids in saturated steam from the boiler?

Boiler manufacturers now guarantee not over one ppm solids carryover in saturated steam.

66—Why is it desirable to feed sodium sulphite continuously?

It is desirable to feed sodium sulphite continuously to provide a certain amount for eliminating oxygen and insure the presence of an excess at all times.

Holding Fixture Saves Relay Testing Time

THE illustrated fixture for holding battery field and battery charging contactors as they are being tested was recently placed in operation at Allis-Chalmers' Electrical Control Plant. The device cuts operation time from several minutes to less than one minute.

Operation

By pushing a handle at the bottom of the mounting panel, the jaws of the fixture are made to move forward by a lever acting against a small compression spring. This also opens the jaws so that a relay may be inserted. Releasing the handle causes the jaws to engage the relay and draw it against the panel while its lower edge rests on the pivoted locating board. By swinging the locating board upward through 180 degrees, the device can also be made to accommodate battery charging contactors. When in this position, the board is held securely by a catch at the top.

Advantage

Formerly, two bolts inserted from behind the board held the relay in place for testing. With the new arrangement, however, this cumbersome procedure is completely eliminated, yet the necessary position and alignment for testing this sensitive equipment is still maintained.

Rx LUBRICATION

By C. J. Copley and Will Risk

Part XIV—Diesel Engine Lubrication

A Diesel engine is a heat engine. Unlike the gasoline engine the fuel in Diesel cylinders is ignited by the heat developed by compression in each cylinder and not by a separate ignition system.

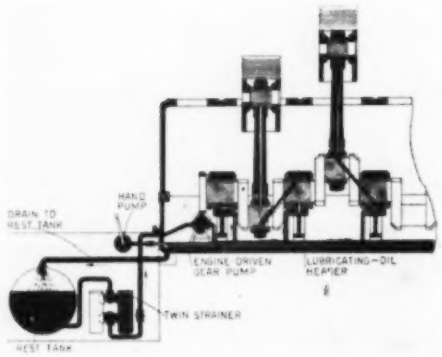


FIG. 1. TYPICAL DIESEL ENGINE LUBRICATION SYSTEM. THE OIL DRAINS TO AN OUTSIDE RESERVOIR OR REST TANK. A GEAR-TYPE, ENGINE-DRIVEN PUMP DRAWS OIL FROM THE REST TANK THROUGH STRAINERS AND AN OIL COOLER (NOT SHOWN) AND DISCHARGES TO THE ENGINE LUBRICATION SYSTEM.

Diesels are designed to operate at various speeds. Under 500 rpm they are considered as "slow" speed engines, between 500 rpm and 1,000 rpm as "medium" speed and over 1,000 rpm as "high" speed engines.

The fuel they consume is injected into their combustion chambers by various methods, some using air under pressure, others using water, while the most common is by "solid" injection, where the fuel is mechanically sprayed directly into the combustion chamber. Some are designed to use "opposed" pistons usually to reduce vibration; some utilize cross-head construction to reduce the weight of reciprocating parts; while others, known as "double acting," have combustion chambers at both ends of their cylinders to increase the ratio of power produced to the engine weight.

Specific Diesel engines may also differ in such things as design of the combustion chamber, types of fuel nozzles, lubrication system employed (Fig. No. 1) and other variations incorporated by individual builders of Diesel engines.

The Diesel is used primarily as a prime mover as well as an auxiliary source of power. It has a broad field of service. It is highly economical. Therefore interest in its development has been keen and its growth in recent years has been corre-

CHART A (BELOW) RELATIVE EFFICIENCIES, HEAT ACTIVATED PRIME MOVERS. CHART B (RIGHT) GRAPHIC REPRESENTATION OF THERMAL EFFICIENCIES AND LOSSES IN GASOLINE AND DIESEL ENGINES.

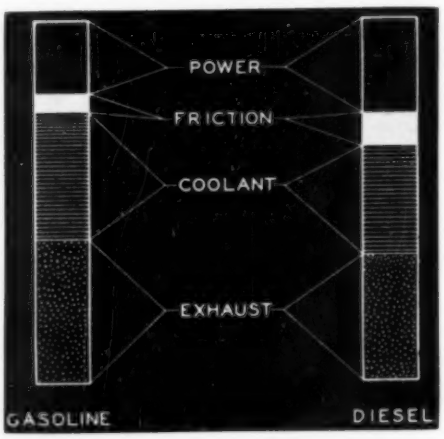
CHART A

RELATIVE EFFICIENCIES*

Heat Activated Prime Movers

TYPE	% THERMAL EFFICIENCY
Steam Locomotive	6 to 8
Stationary Steam Engine	8 to 22
Turbines	10 to 27
Gasoline Engines	22—30
Diesel Engines	32—40

*Approximations



spondingly rapid. Today its application to industry is most diversified. To meet this wide diversification of use, large Diesels of over 22,000 hp capacity have been developed for central station service, as well as small units of only a few horsepower for auxiliary use.

The wide acceptance of the Diesel engine stems from the fact that it is the most efficient of all prime movers dependent upon heat as the source of their power producing energy. (See charts A and B).

As an example of the economy of the Diesel over other types of power plants which might be used it is interesting to note that the famous Union Pacific Diesel-drawn M 10,001 train crossed the U. S. at a cost of $83.00 for fuel. A similar steam-drawn train would have consumed around $300.00 worth of coal for the same trip.

BASIC PRINCIPLES OF CONSTRUCTION

Regardless of how many cylinders or the particular mechanical design of the engine, these basic components are found on all types:

An air filter through which clean air at atmospheric pressure is brought into the Diesel cylinder to be compressed.

Inlet valves through which air enters the cylinder.

Piston rings and cylinders which make it possible to compress the volume of air above the piston and increase its pressure.

Fuel injection system which enables the injection of liquid fuel into the compressed air space above the piston at or near the top of its stroke.

Exhaust valves which allow the exhaust gases to escape from the cylinder after the power stroke.

Connecting rod, crank shaft, etc., which enable the transmission of power from the moving piston to a source outside the engine.

Cooling system to cool the cylinder walls and prevent destruction of the cylinders.

LUBRICATION PROBLEM

To simplify our discussion we will concern ourselves only with those particular problems imposed by the Diesel engine upon its lubricant and compare them with the lubricating problems of the commonly understood gasoline engine.

A study of Chart C will emphasize the important degree of difference between gasoline and Diesel engines that have a direct bearing on their lubricating problems. From this tabulation we can earmark and immediately identify those operating characteristics that pose a more severe demand upon the lubricating oil required by the Diesel engine as being:

CHART C

FACTORS AFFECTING LUBRICATION

Gasoline Engine	Vs.	Diesel Engine
Air & Fuel	Gas Compressed	Air
6:1	Compression Ratio	16:1
90-150 psi	Compression Pressure	500-600 psi
400 F	Compression Temperatures	1200 F
3800 F	Combustion Temperatures	3800 F
1200 F-1300 F	Exhaust Temperatures	700-1000 F

Increased Pressures—3 to 6 times ring and bearing pressures.

Increased Heat—3 times the heat to affect the protective oil films.

Increased Oxidation—More oxygen at higher temperatures to implement oxidation of the oil film.

From the lubricant's point of view, its problem in a Diesel engine is threefold:

Protects the Cylinders and Rings Against Wear—An explosion of burning power drives each piston and "oil wet" cylinder walls are the elements of protection against wear of liners and rings.

Protect the Cylinders and Rings Against Deposits and Blowby—Protection against deposits and blowby is the lubricating oil's way of saying: "More hours of continuous operation. More hours between overhauls and cleaning."

Protect Bearings Against Wear—For protection of bearings against wear, two things are necessary: **One**, the bearing and the shaft must be separated by a film of oil so that the microscopic high spots of their surfaces do not touch. **Two**, the oil must be non-corrosive to bearing metals used in the engine.

LUBRICATION TROUBLES

The lubrication troubles most often encountered in Diesel engine operation are either caused by improper selection of lubricant or result from the improper operations or maintenance of that engine.

Quite likely any one "trouble" might well be the result of any number or combinations of causes. Efficient Diesel engine lubrication is not obtained by the selection of a proper lubricant alone. Efficient lubrication can only be obtained when all negatively contributing factors are corrected.

Following is a partial list of some of the more common "troubles" and their causes.

HIGH OIL CONSUMPTION . . . Excessive oil consumption may be the result of several causes not directly attributed to the oil in use.

- Excessive operating temperature
- Excessive dilution of the oil
- Clogged oil rings
- Excessive oil splash
- Worn cylinders, piston rings or ring grooves

BEARING WEAR . . . Excessive bearing wear is often caused by the lack of a proper protective oil film.

- Use of too thin a lubricating oil to provide adequate oil film
- Use of too heavy an oil that restricts rate of oil supply
- Low oil level
- Low oil pressure
- Plugged oil passage
- Excessive bearing side clearance that allows oil to escape without setting up an "oil wedge"
- Use of a "dirty" oil

STUCK RINGS . . . Excessively high temperatures tend to oxidize the lubricating oil and build up "carbon deposits" that freeze the piston rings in their slots.

- Use of an improper lubricating oil that oxidizes to form hard carbon in the ring slots.
- Operating the engine at too high a temperature, thereby placing an added increment of heat upon the lubricating oil
- Dirty air
- Unsuitable fuel oil
- Over-supply of lubricating oil
- Insufficient cooling

LUBRICATION PRESCRIPTION

Practical operating experience has dictated four LUBRICATION PRESCRIPTIONS for the average Diesel engine: **One**—the oil must protect the cylinders and rings against wear. **Two**—the oil must protect against deposits and blowby. **Three**—the oil must protect bearings against wear. **Four**—the oil must provide economical lubrication.

To Prevent Wear—Because the oil in a Diesel is drastically thinned by the hot piston or cylinder wall, the oil must maintain exceptional wear-prevention properties. To further protect cylinders and rings against wear, the oil used must vaporize cleanly at the "scene of explosion." It must not leave deposits of abrasive material to cause wear.

To Protect Bearings Against Wear—To maintain a proper thickness of film between the shafts and bearings of the engine, it is necessary to select an oil of the correct viscosity. The builder's instruction book for the engine serves as a guide. Because an unimpeded oil flow through oil lines and screens to vital bearings is important, the oil used must have great resistance to deposit formation and have considerable capacity to keep engine surfaces clean.

To Protect Against Deposits and Blowby—In order to assure long hours of ring freedom and protection against loss of power in the engine, it is necessary that the oil selected be built for Diesel service. Such an oil, when baked to a crisp by the terrific heat in the cylinder will leave deposits that are soft, weak and easily blown away by the hot gases around the rings. Unlike unsuitable oils, they will not form hard, adhesive or gummy-like deposits which resist removal through the normal action of the engine.

To Provide Economical Lubrication—To be an economical lubricant, the oil must protect the rings, cylinders and bearings against wear; provide maximum freedom from deposits that stick rings, create blowby, interfere with valve action, and clog exhaust ports; and minimize maintenance expense on the engine over a long period.

CONTAMINATION OF DIESEL LUBRICATING OIL

Long and efficient service of Diesel lubricating oil may be assured by proper care of the oil and regular attention to the cleanliness of the oiling system.

The relation between the Diesel engine and its lubricating oil is one of paradoxes. The engine wants the oil to stay clean, yet it makes it "dirty"; it wants the oil to stay cool, yet it makes it hot; it wants the oil to be "slippery", yet it makes it gritty; it wants to use oil, yet the owner wants to save it.

A properly selected lubricating oil does not wear out, nor does it "break down" while in service in any engine, gasoline or Diesel. The fact that it becomes contaminated and should be cleaned or perhaps even replaced is a natural result of engine operations.

The engine often burns the oil and sometimes turns part of it into some form of objectionable contaminant. It puts unburned fuel in the oil and hence may make it too thin for safe continuance in service. It often puts moisture into the oil, helping to form objectionable emulsions. The engine itself does many detrimental things to its lubricating oil, thereby making it only good sense and good practice to continually remove those damaging contaminants while the oil is in service, or even to replace the used oil in order to get such objectionable impurities out of the engine before they cause expensive damage.

The important thing is the **rapidity** with which the condition is reached that demands the removal and replacement of the oil. The rate at which the oil is contaminated is directly related to the operation and maintenance of the engine, the kind of engine maintenance, the proper operation of the engine, and the efficiency of the oil filtering systems.

Assuming even the proper lubricating oil is in service in the Diesel, impurities **will** develop. The following are those impurities most commonly encountered together with their source of employment:

Oil Dilution—Fuel oil, because of improperly adjusted or worn nozzles, poor combustion regulation, etc., may seep down past the rings and contaminate the lubricating oil. It will not later evaporate from the oil in the engine.

This dilution then weakens the lubricating film. Containing sulphurous material, it will promote sludge formation. It may even bring about a definite acid condition to cause corrosion of bearings in some cases.

Carbon Particles—From the combustion of fuel, remain in the engine and eventually get into the oil. Sooner or later these products of combustion build up in the piston grooves and freeze the rings in place. Finally the rings will not expand and contract as they should.

Carbon deposits from the burned fuel alone may not be the cause of poor ring operation. More likely they mix with the fuel oil stewing in the hot parts of the cylinder and form a gummy mass that does stick the rings.

Incombustibles—Encourage wear and serve as catalysts to promote more rapid oxidation of the lubricating oil. Incombustibles include dirt, dust, etc.

Water or Moisture—Collects in the lubricating oil because water is formed wherever fuel is burned. All of the water, of course, will not be removed in the exhaust. Some may be evaporated in the engine. None-the-less, frequent filtration is necessary.

Tightness of water jacketing system, piston cooling connections, improper control of cooling water temperatures are factors contributing to water contamination.

Oil Oxidation Products—Are more readily brought about by agitation of the oil in the presence of heat and air. The oxidation is further promoted by other contaminants like dust, dirt, etc. Such oxidation products include those soluble in the oil, which will not be deposited in the engine at normal temperatures of operation, and those insoluble in the oil, which will clog strainers, oil passages and foul the entire circulation system.

Sludge—Formed by an intimate mixture of impurities brought about through circulation with the oil when it is under heat and pressure often aided by moisture.

Metal Particles—Get into the oil because of wear on the engine. Although they form very, very slowly with normal operation, they can serve as catalysts to encourage oxidation of the lubricating oil.

Economical Diesel engine operation demands the employment of some form of filtering devices that will continually remove such impurities from the oil in the crankcase. Particularly in the case of large stationary engines, it may be sound economy that the oil not only be cotninuously filtered while actually in the engine but that it be removed periodically from the engine and separately treated.

The purification of used Diesel engine lubricating oil is often a complex problem particularly since many types of "additives" are commonly a part of many Diesel lubricants. Studied consideration should be given any proposed filtration or treatment of such oils. Since it is an important subject, a subsequent article will deal with "The Purification of Lubricating Oils".

Push Button Operation Only a Dream

By B. C. Mallory
Stone & Webster Engineering Corp.

The dream of operating a steam electric power station by one man sitting in an air conditioned office watching a single dial and twisting a single control handle to solve all operating problems is only a cartoonist's exaggeration.

ALTHOUGH increasing costs of operating personnel are giving greater emphasis to centralized control, the one man push button operation of steam electric power stations is only a dream. Present day controls and equipment are not trusted to operate satisfactorily without adequate attention.

Limitations

The amount of advantageous centralization revolves about the number of manual controls that can be handled by one man in time of trouble. One man can supervise many controls while everything is functioning properly, but in time of trouble the number and complexity of the controls that one man can handle depends to a large extent on the panel layout and the ability of the man.

A recently constructed steam electric power plant with only two boilers and two generators had a centralized panel control board. The boiler control panels of even this relatively minor arrangement totaled 38 ft, and contained 84 indicators, 36 recorders, 12 controllers, 50 sets of start and stop switches with an average of 3 lights to a switch. The turbine panels totaled 26 feet and contained 14 indicators, 20 recorders and 16 sets of start and stop push buttons averaging 3 lights to a switch.

Trend

A vast amount of thought and effort should be applied to developing reliable controls for automatic starting of boilers and turbines, especially from an overnight standby condition. Managements are asking engineers to consider seriously some automatic time clock device, possibly with temperature and vibration sensitive adjustments, to co-ordinate starting procedures properly, both from the viewpoint of uniformity of operation and ease of control.

The number of controls that one man may handle may be increased safely to some extent by logical arrangement and use of different types of control handles for different types of control, so that routine adjustments become simplified and, in emergencies, the operator acts from habit without having to think out each step of what he should do.

There is a need for miniature mechanical instruments comparable to those on electrical boards or to those used for large airplanes. Furthermore, for ease and reliability of operation, the instruments and controls should be segregated to permit manipulating the vital controls from a central point with those having minor manual adjustments for efficiency and the historical items located at some less strategic point.

Abstracted from an address presented before the Winter General Meeting of the American Institute of Electrical Engineers.

Centralized Control of Steam Electric Power Stations

Disadvantages

1. Space required for control room in heart of station. Adds to initial construction cost by adding building space and may add it for the full height of the station.
2. Each additional instrument and control adds equipment to be maintained and each is a potential source of trouble because it may function incorrectly.
3. Complexity of many instruments, controls, alarms and lights require a considerable training period for operators, especially if the mechanical and electrical men have to substitute for one another. With two mechanical men and one electrical man in a control room, this substitution might easily be required.
4. Added cost; due to either duplication of controls, or longer runs of instrumentation and control leads and the space required for them.

Advantages

1. Presentation of all pertinent data to one operator to give a better understanding of the plant as an integrated co-ordinated unit.
2. Ability of operator to take corrective action simultaneously for two or more operations, should conditions demand.
3. Avoidance of communication errors.
4. Improvement in quality of operation (better operating conditions of the centralized control room attract higher type personnel.) This means more than better thermal efficiency as it should give better maintenance of load during upset conditions, quicker restoration after an interruption, and better judgment in preventing an interruption.
5. More automatic controls may be required, which tend to free the operator from details and permit more supervision.

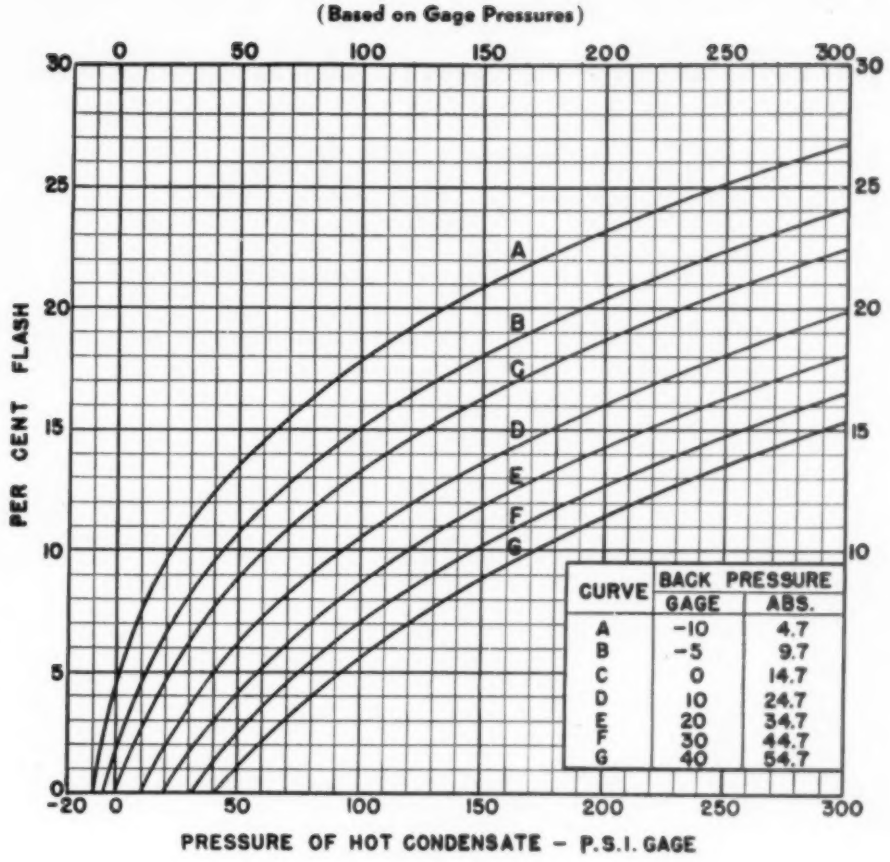


Chart for Flash Steam Calculations

ENGINEERS desiring to know how much flash steam is formed upon condensate being discharged to return lines, whether for use in a heating system, or for process steam supply system, etc., can easily and quickly find the answer on the accompanying chart.

Example

Supposing in a given plant some 100,000 lb of condensate per hour at an initial pressure of 120 lb is discharging to a back pressure of 30 lb (gage). How much flash steam would be formed?

Going to the Chart, the back pressure table (inset) indicates 30 lb back pressure to be curve F. After locating the 120 psi on the horizontal base line, move vertically up to where this line intersects curve F, and take your reading, in this case, 8.5%.

Since this figure is the per cent of flash steam formed per pound of water, the total flash steam formed would be 100,000 × 8.5% or 8500 lb per hour available for other use.

Chart Available

Reprints of this chart and also a similar chart based on absolute pressures are available from the Armstrong Machine Works, Three Rivers, Mich.

Courtesy Armstrong Machine Works

Technical Knowledge Essential In Effective Plant Management

By Embry C. Rucker

H. Earle Runion
Production Engineers
Louisville, Ky.

There is a popular theory that a plant manager need only to be familiar with the principles and techniques of management. These are obviously essential, but to be completely effective, he must also have a technical understanding of the business in all its phases.

IT becomes increasingly obvious how important it is that those in management positions have good technical understanding of their businesses.

Subordinates

A manager who relies entirely on his immediate subordinates for all information of matters beneath them and accepts their judgment implicitly, is riding for a fall. He becomes a figurehead. He must be sufficiently familiar with the workings of all phases of the business that he can question his subordinates intelligently. No matter how capable a subordinate is, he is going to do a better and a more thorough job, if he knows that his superior understands his work to the point that he can ask probing and, sometimes, embarrassing questions.

Sometimes a business appears to be going along well when suddenly things start to go wrong. Conditions are exposed which have existed for a long time and have been gradually affecting the business until they become noticeable to the top man. He wonders how long this has been going on and why didn't he know. If he had had a technical understanding of his business, he would have known long before the conditions became bad. In all probability, the conditions would not have come into existence at all.

Case Study

An extreme example of a top management's technical incompetence is found in the case of a good sized process machinery manufacturing plant, now defunct.

About fifty years ago a man developed a new method of processing a commercially used chemical. He was quick to see the possibilities, and began manufacturing processing machinery to sell to chemical manufacturers. He was quite successful, and, being a good open-minded manager, along with having a complete technical understanding of his business, the business grew until it was beyond the scope of one man to control intimately each part of the business. Still the business prospered under his leadership. Finally, he died.

The business was inherited entirely by his wife. There were no sons to take over and the widow did not think that anyone in the organization was competent to take her husband's place as head of the business. So she hired a man from another industry, a man with some knowledge of management principles, but no knowledge of that particular type of business. He did not attempt to educate himself in the *innards* of the business, but sat at the top and operated solely through his division heads, some of whom he hired to replace the older men in the organization.

Competition improved their products, but this business did not. Competition cut costs, but again this company did not. Up until almost the end, the man in charge was not completely aware of just what was wrong. He knew that sales were dropping and costs rising, but he didn't know why. He just didn't have enough technical knowledge of the business. He didn't know its *innards*. He had become the figurehead on an antiquated vessel and the newer liners, without figureheads, steamed past him. The business failed fifteen years after the founder died.

Balanced Management

A manager has to realize that knowledge of the principles and techniques of management in general is not enough. Conversely, knowledge of only how to make the goods or to sell the goods is not enough. It is not too difficult for the man trained in scientific management methods to learn intimately the workings of a new business. If he'll get down to where people can talk to him, he'll learn a lot. And, of course, there is good technical literature on almost every subject.

The manager with the proper balance of managerial and technical knowledge is a necessity to a business if it is to operate at high efficiency today.

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Yarway Impulse Steam Trap with new stainless steel body.

Yarway Impulse Steam Traps get equipment hot and into production *faster*. Extra profits!

Then they keep it *continuously* at peak operating temperatures for maximum production. More extra profits!

What's the reason for *hotter, sooner?* Just this. When steam is turned on, Yarways open wide, discharging the air and condensate *in a hurry* —closing only when steam arrives. Then, when operating temperature has been quickly reached, the little valve (only moving part) literally *floats on the load* . . . discharging heat-retarding condensate as soon as it forms instead of waiting for quantities to accumulate. Thus equipment is held at peak operating efficiency.

Other economical features of Yarway traps—minimum maintenance, easy installation, low initial cost.

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Stainless Steel Body

Nest of Yarway traps installed with Yarway Strainers on cloth dryer. Note small space required.

YARWAY IMPULSE STEAM TRAP

Helping the MAN-IN-THE-PLANT

Readers are invited to send in kinks, ideas, and suggestions. Payment is made for all material accepted.

Special Wrench for Plug Valves

THE wrench illustrated here is particularly advantageous where several valves of the same size are in the same vicinity. It can be easily fabricated from ¾ in. bar stock. Make a bend near the center of a 5 ft piece so that the square corners formed will fit over the square on the end of the plug.

After the short end is brought back and tack welded to the long end, cut a small piece to fit across the bent section of the wrench to form a "box" for turning the square head of the plug.

H. A. HESS (HOUSTON, TEX.)

Color Shows Sheave Diameter

IN the use of V-Belt drives where there are many different speed ratios I find it convenient to paint the hubs of our sheaves in accord with a color code based on sheave diameter. The diameters of sheaves can then be determined without stopping production.

ALBERT WEIGLE
Huntsville, Ala.

Regulating Valve Held in Position

ON the oil coolers in our plant, we have a ¾" gate valve for regulating flow. The stem of this valve comes through the floor plates near a steam turbine and the vibration of the turbine caused the valve to close by itself. The stem on this valve is approximately 6' long and is protected above the floor with a 1" pipe bolted to the floor plates. To correct this trouble, we installed a thumb screw near the top of the shield pipe. Now the valve can be regulated and the thumb screw tightened, so there is no more worry about it vibrating closed.

L. B. MCGEE (LA.)

Air Intake Equalizer

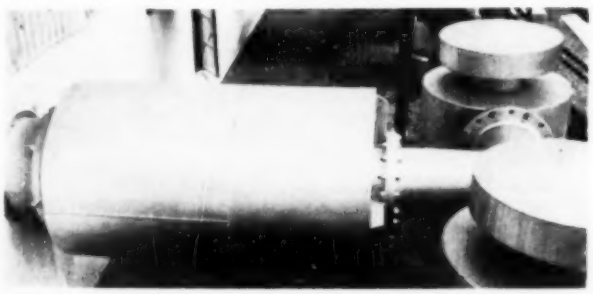
EVEN with dual air cleaners on the outboard end of the intake line of each of a battery of 1,000 hp gas engines, there was a noticeable pulsation in the suction which was felt at the various cylinders and which resulted in unequal volumes and pressures of air at the various suction valves of the engine.

To smooth out the flow of intake air and thus improve combustion and operation, equalizers, constructed much like mufflers with dual shells and baffles, were cut into the intake line close to the tee connecting the two air cleaners. The extra volume of air in this added space tended to provide an even flow through the suction line, and to reduce the effect of the suction impulses on the oil bath within the cleaners.

Constructed from light steel plate, and welded throughout, the equalizing chamber could be carried on the suction line from its point of support at the station wall, and required no additional foundation or bracing. Connection to the cleaner tee was made with bolted flanges and the usual flat gasket.

ELTON STERRETT
Houston, Texas

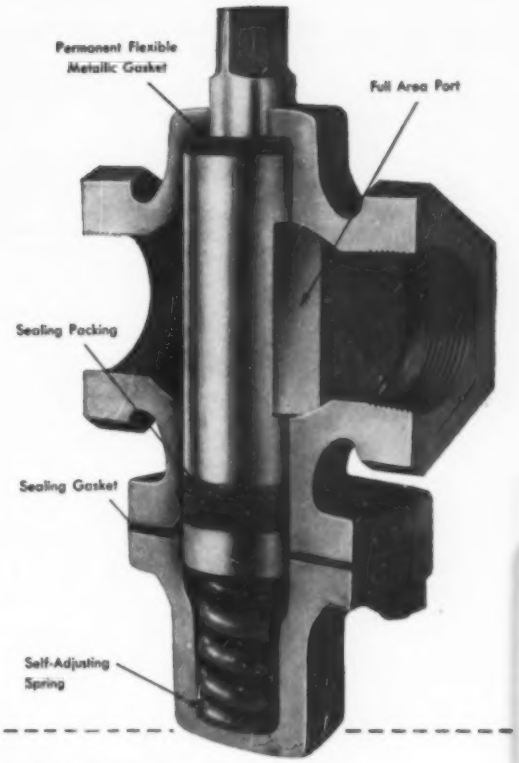
EQUALIZERS SMOOTHED OUT THE FLOW OF INTAKE AIR AND THUS IMPROVED COMBUSTION AND OPERATION.



NON-LUBRICATED

LEAK-PROOF

DROP-TIGHT SHUTOFF



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The Honeywell Cylindrical Plug Valve . . . incorporating many unique design features . . . gives dependable, maintenance-free operation.

This is a compact, easy-to-operate plug valve which never requires lubrication . . . saving time and money. A special metallic gasket assures leakproof operation for the life of the valve. At a slight additional cost, a ground finish plug can be provided for drop-tight shutoff. For viscous fluids, spring housing can be tapped for steam line connection.

Call in your local Honeywell engineer for detailed information about the Cylindrical Plug Valve and such other Honeywell Process Control Specialties as: Transfer Valves, Liquid Level Devices, Hi-Lift Hand Control Valves and the Space-Saving Bypass.

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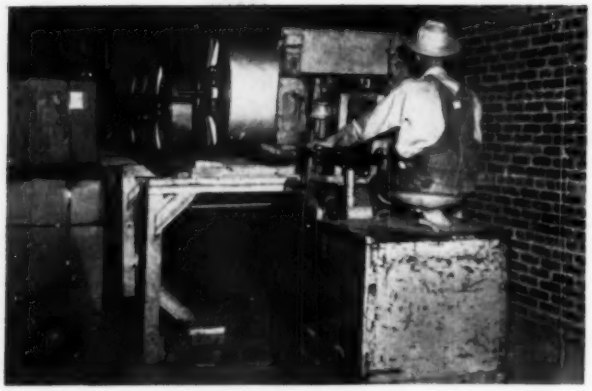
Honeywell — PROCESS CONTROL SPECIALTIES



devised at the plant, and made of soft, scrap material, are slipped over the truck's forks, and the beams are lifted from racks in the interior of the highway trailer truck delivering them, and moved along the loading platform to the warehouse. Here they are deposited on storage racks. As needed the beams are removed by fork truck and taken to a production line rack. This is made of angle irons and holds two beams. Mounted on skid legs it is easily picked up and moved into the production area of the plant by means of the battery-powered hand truck.

Handling Cost Reduced

BALES and cases of rayon yarns and staples, as well as cotton staples and yarn, together with beams of rayon yarn are now being handled expeditiously, with less damage and "at a great deal less cost" at the plant of the Marion Manufacturing Company, Marion, N. C., producers of grey goods both in rayon and cotton and in mixture. This efficiency in operation has come about since the Company installed storage battery-powered industrial truck units for the handling and storage of bales, cases and beams.

Two fork trucks and a powered hand truck, of the platform type, comprise the plant's present fleet. The first fork truck was obtained in the spring of 1948, the other two units late in 1948 and early 1949. One fork truck has a capacity of 1,000 lb, and a lift of 60 inches. The hand truck is used to transport skids and beam racks, while the second fork truck can lift a load 90 inches vertically, and has a capacity of 2,500-lb.

According to W. W. Greene, in charge of raw materials at the plant, the 1,000-lb capacity fork truck "paid for itself in about a month", while it was used to move incoming shipments of looms into plant buildings. Each of these looms weighed approximately 1,-800-lb and arrived in box cars. A total of seventy such cars arrived at the plant. In the first operations of unloading, a loom would be taken from a car, set on a wheeled truck and moved by a crew of approximately eight men to a plant elevator and thence into position. Some twelve cars had been unloaded in this fashion, while demurrage on waiting freight cars mounted. Then the fork truck, with counterweighting added to take care of the weight in excess of the truck's rated capacity, was called into service.

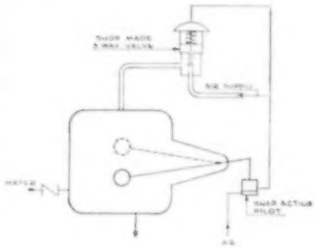
"The work of unloading, moving and deposit of the looms on the mill floor was done in about one-fifth of the time that had been required to do it manually and with a less amount of man-power involved." Mr. Greene said, "As a result, our saving on freight car demurrage not only was considerable, but we were able to install the new looms much more quickly. All these savings amounted to a considerable sum, and that is why we say that the truck paid for itself in the month's time that it was used for this operation alone."

In the handling of rayon staple in bales either, or both, of the fork trucks are used. These bales weigh approximately 500-lb. They are picked up and carried two at a time from the unloading platforms into the adjoining warehouse area. Here they are tiered five- to six-high. Rayon yarn, in cases, weighs between 400 and 450 pounds a case and is handled in the same manner.

The company has worked out a method of handling the loom beams of rayon warp, which has greatly reduced the time between receipt and movement into production. Padded sleeves or "shoes",

Automatic Blow Cases

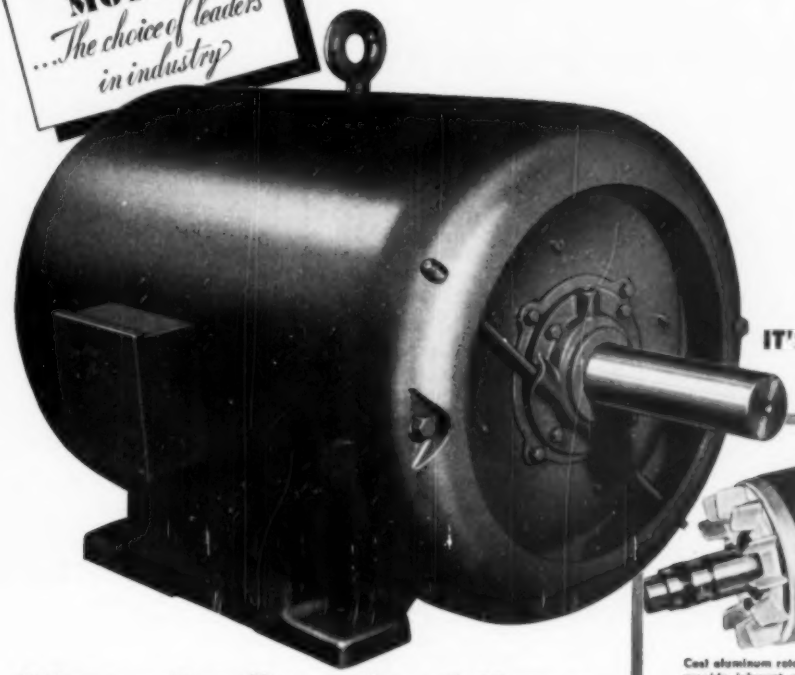
WE recently had to install toilets for the use of mechanical employees handling maintenance work on one of our largest refining units. Some of these toilets were almost 200 ft above ground level. Water pressure available at the site would not lift more than 130 ft. So we designed the illustrated auxiliary lift.



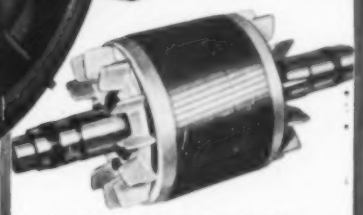
At low water level the snap acting pilot positions the three-way valve to vent to the atmosphere and close off against the air supply. This allows water to flow through the check valve into the drum. At high level the pilot causes the three-way valve to admit air above the water in the drum and closes the vent. A check valve in the water supply line prevents reverse flow.

WILLIAM H. FORTNEY
Humble Oil & Refining Co.
Baytown, Texas

WAGNER MOTORS
...The choice of leaders in industry



IT'S WAGNER *because:*



Cast aluminum rotors, pioneered by Wagner, provide inherent mechanical and electrical characteristics that add quality and dependability to Wagner type CP Motors.

The rugged frame, used on Wagner type CP Motors, has extra large air ducts around the entire stator to prevent clogging and to permit plenty of fan-driven air to cool the motor.

Wagner Totally-enclosed Motors *best* for really dirty jobs!

Wagner totally-enclosed fan-cooled motors are designed for a particular purpose—to operate efficiently and safely under conditions that would quickly damage an ordinary open type motor. In really dirty jobs—in atmospheres filled with dust, fumes, moisture, abrasives, steel chips and other harmful elements—these *protected* Type CP Motors keep on working, delivering dependable power with no maintenance other than periodic lubrication. Wagner totally-enclosed fan-cooled motors are varied electrically to suit a wide variety of application requirements.

Bulletin MU-185 gives complete information on Wagner Motors. Twenty-nine sales and service branches, in principal cities, are ready to help you on any motor problem. In addition, almost 500 authorized motor repair shops provide speedy, nationwide service facilities.

Wagner Electric Corporation
EST. 1891

WAGNER ELECTRIC CORPORATION
6383 Plymouth Ave., St. Louis 14, Mo., U.S.A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS • AIR AND HYDRAULIC

BRANCHES IN 29 PRINCIPAL CITIES

NEWS
FOR SOUTHERN INDUSTRY

Atlantic Steel to Have Open House

Agricultural machinery and equipment made by Southern manufacturers, who use Atlantic Steel Company's prime materials or processed parts, will be spotlighted at the Atlantic Steel Company's **"Dixisteel on Dixie Farms" Open House**, May 5-6 in Atlanta, Georgia.

In announcing the 1950 Open House plans, Mr. R. S. Lynch, Atlantic Steel Company president, pointed out that exhibits would be located throughout the plant. Plows, harrows, distributors, peanut pickers and a wide range of products for the farm will be featured in these mechanized displays.

In addition to the mechanized exhibits, plant engineers are invited to attend the extensive plant tours. Beginning with the open hearth and continuing on through the plant, displays will show how raw materials are processed into semi-finished and finished products. Tour will include open hearth, soaking pits, blooming mill, bar mill, strip mill, wire and nail mills, galvanizing department, and forge shop.

FUTURE EVENTS
Of Engineering Interest

ASSOCIATION OF IRON & STEEL ENGINEERS, Sec'y, 1010 Empire Bldg., Pittsburgh, Pa.
Apr. 3-4, Spring Conference, Birmingham, Ala.

MIDWEST POWER CONFERENCE, Roland A. Budenholzer, Dir., Illinois Institute of Technology, 3300 S. Federal St., Chicago 16, Ill.
April 5-7, Twelfth Annual Conference, Sherman Hotel, Chicago, Ill.

AMERICAN SOCIETY OF TOOL ENGINEERS, Sec'y, 2567 W. Grand Blvd., Detroit, Mich.
Apr. 10-14, Industrial Cost-Cutting Exposition, Philadelphia, Pa.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS, Sec'y, 29 West 39th St., New York, N. Y.
Apr. 12-14, Spring Meeting, Hotel Statler, Washington, D. C.

AMERICAN STEEL WAREHOUSE ASSOCIATION, Walter S. Doxsey, Pres., Terminal Tower, Cleveland, Ohio.
Apr. 27-28, Annual Meeting, Houston, Texas.

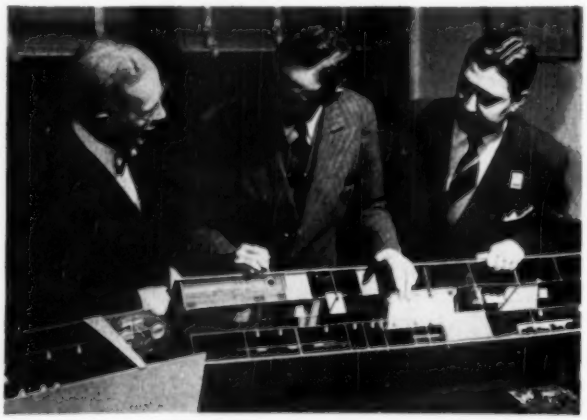
HOUSTON INDUSTRIAL EXPOSITION, Ed G. Lenzner, Gen. Mgr., 41 San Jacinto St., Houston 2, Texas.
May 10-14, First Annual Exposition, Coliseum, Houston, Texas.

"More Power to America Special"

Inspecting a scale model of one of the exhibit cars of General Electric's "More Power to America Special" are, left to right: **C. H. Lang,** Vice President in charge of Sales, Apparatus Department; **C. P. Fisher, Jr.,** Manager of the Apparatus Exhibit Train Division; and **J. S. Smith,** Manager of the Apparatus Department's Advertising and Sales Promotion Divisions.

The "Special", first train of its kind in industrial history, will display a vast array of the most modern electrical apparatus ever assembled for exhibit.

It will begin a nationwide tour of key industrial centers this spring for inspection by utility and industrial executives and municipal leaders. Schedules for Southern and Southwestern industrial centers will be announced in SP&I.



General Electric to Launch "More Power to America Special"

The "More Power To America Special", first train of its kind in industrial history, is being launched on a nationwide tour this spring by General Electric's Apparatus Department.

Exhibits of more than 2,000 electrical products, processes and techniques ranging from precise aircraft instruments to complex working models of steel mill, textile and other industry equipment, are displayed throughout nine cars of the train.

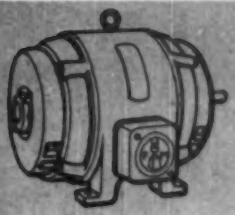
C. H. Lang, Vice President in charge of sales for the company's Apparatus Department, said the train will visit the country's key industrial centers for inspection by utility and industrial executives and municipal leaders.

Pointing out that the exhibits dramatize the latest apparatus and ideas for producing and using electric power most efficiently, Mr. Lang hailed the mammoth "showcase on wheels" as a symbol of the contributions the entire electrical industry is making to the progress of industrial America.

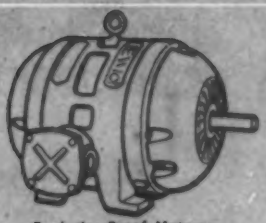
The displays portray the latest advances in power generation and methods and equipment for the profitable use of electricity throughout all industry. They have been designed especially for those who produce electric power and those who put it to work in industry and the community.

Included in the exhibits are turbines of all types—steam, gas and mercury; equipment for transmitting

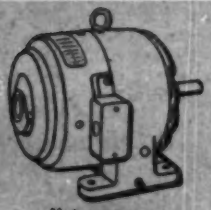
Vertical U Motors



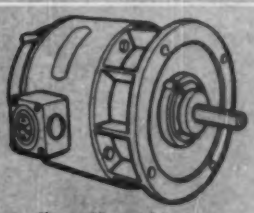
General-Purpose Ball-Bearing Motors



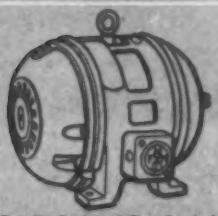
Explosion-Proof Motors



Motorgears

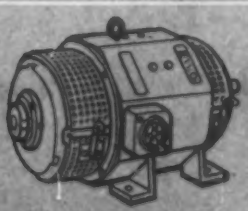


Flange-Mounted Motors



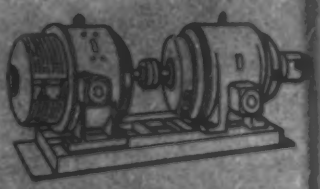
Totally Enclosed Fan Cooled

when it comes to Motors...



D.C. Motors

You stand to gain much in dealing with your Fairbanks-Morse Branch or Dealer as the single source for *all* your electric motor requirements. Not the least are the benefits of undivided responsibility, unprejudiced advice and application assistance. For your copy of the handy "Pocket Panorama" which illustrates the complete line . . . write Fairbanks, Morse & Co., Chicago 5, Illinois.



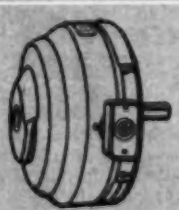
Motor Generator Sets

FAIRBANKS-MORSE

A name worth remembering

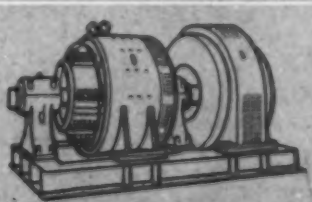
DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES • MOTORS • GENERATORS
STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT • MAGNETOS

High-Speed A.C. Generators



Axial Air Gap Motors

Low-Speed A.C. Generators



Frequency Changer

and distributing electric power, and motors and controls engineered into combinations that can perform a wide variety of industrial operations.

Other displays include precise measuring and recording instruments; new developments for community improvement, such as street lighting and sewage treatment equipment, and products which contribute to national security.

The train is hauled by an Alco-G-E two unit, 4,000-hp, Diesel-electric locomotive which itself is part of the unusual series of displays. The cars are built by the Pullman Standard Car Manufacturing Company.

◆

Ironton Fire Brick—Chattanooga

ROBBINS AND BOHR, 535 Chattanooga Bank Bldg., CHATTANOOGA 2, TENN., have been appointed Tennessee representatives for THE IRONTON FIRE BRICK CO. of Ironton, Ohio.

◆

Reynolds Now Running Four Pot Lines at Jones Mills Plant

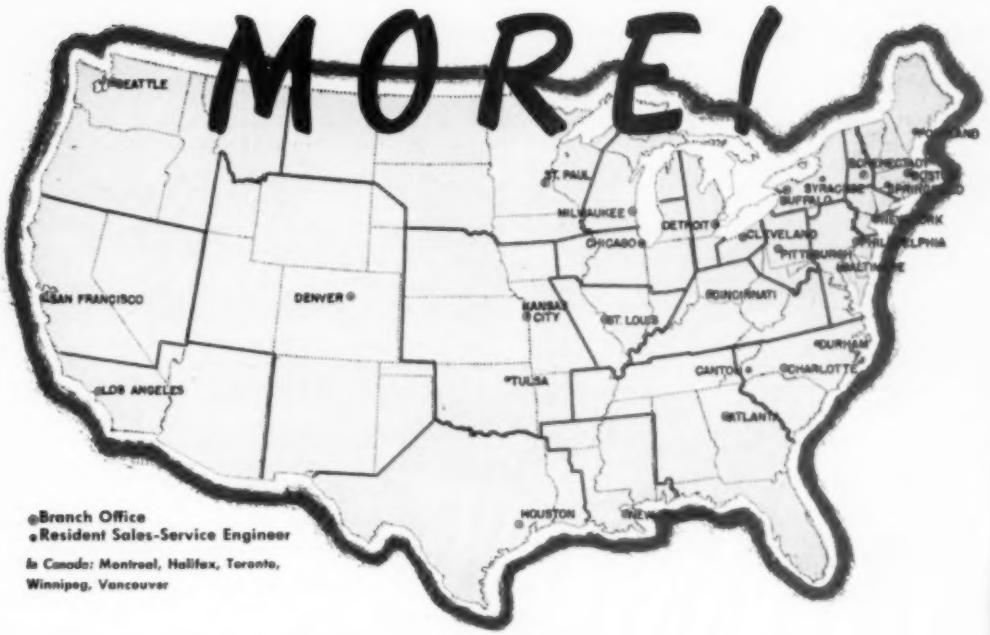
First capacity operation of Reynolds Metals Company's Jones Mills (Arkansas) aluminum reduction plant since the war started late in March.

The plant has four pot lines, each with a capacity for producing 36,000,000 lb of aluminum annually. This gives the plant a yearly capacity of 144,000,000 lb of aluminum.

When Reynolds leased the plant from the government in 1946, it was only possible to start up two of the four pot lines there because of lack of economical electric power. The plant includes 68 large engine-generator sets capable of supplying 78,000 kw of electric power which is sufficient to operate only two of the four pot lines.

In April, 1949, the third pot line was started up by using electric power supplied by the Arkansas Power & Light Company. But in August, a strike closed down the plant which was not put back in operation till late in September. At that time, only two of the four lines were started up.

However, electric power became available from the new Lake Catherine power plant under a long-term contract with the Arkansas Power & Light Company, and Reynolds reopened the third pot line in February and the fourth late in March.



More Power per fuel dollar—that's the basic business of Bailey Meter Company. Our products and services are designed to deliver increased power plant efficiency for you, whether your plant is large or small. We have had a wealth of experience on every size and type of steam generating equipment.

Here are some of the reasons why we believe we have more to offer you in this field than any other single manufacturer.

More Complete Range of Equipment

Our fully co-ordinated line of Meters and Controls is offered for a wide variety of services and in a complete range of types. This means you need never worry that a Bailey Engineer's recommendation is slanted in favor of a particular type of equipment merely because he is unable to offer the exact one best suited to your needs. It means, too, that you need never fear a buck-passing division of responsibility for the efficient operation of your complete boiler control system.

More Experienced Engineering Service

When you discuss your power plant problems with a Bailey Sales-Service Engineer, you get advice from an organization with a background of more knowledge and experience in steam plant operation than any other manufacturer of instruments and controls can offer you. Our field representatives are graduate engineers with specialized training in combustion, flow measurement and automatic control. Each has completed an intensive course in theory and practice at our plant before being given a field sales-service assignment.

More Direct Sales-Service Offices

Bailey Meter Company's sales-service engineers are located in more industrial centers than those of any other manufacturer of boiler control systems. Truly, prompt and capable service—and with a minimum of travel time and expense—is as near as your telephone. In emergencies a trained Bailey Engineer is available in a matter of minutes or a few hours at the most.

Giving More Power to You

Better power plant operation calls for more power per fuel dollar, less outage, and safer working conditions. We help you to get all of these. Write for Bulletin 15G describing Bailey Meters and Control Systems.

G-30-1

BAILEY METERS

1028 IVANHOE ROAD, CLEVELAND 10, OHIO • BRANCH OFFICES IN PRINCIPAL CITIES

BAILEY METER COMPANY LIMITED, MONTREAL, CANADA

National Supply—St. Louis

Announcement has been made by SUPERIOR ENGINE DIVISION of THE NATIONAL SUPPLY COMPANY of the appointment of JOHN J. FETSKO, JR., as Regional Manager in charge of all inland waterways Diesel sales for the Division. Mr. Fetsko will make his headquarters at Superior Engine Division's office in the Boatmen's Bank Building, ST. LOUIS, Mo. Prior to this appointment Mr. Fetsko had been Sales Engineer for Superior Engine Division, located in New Orleans.

Wolverine Tube Appoints Kromer—Alabama

A. S. KROMER has been appointed factory manager of WOLVERINE TUBE DIVISION'S DECATUR Plant, according to D. W. BLEND, plant manager.

Since the start of manufacturing operations in 1948, Kromer has been production manager of the mill, a unit of Calumet and Hecla Consolidated Copper Co. He has been with the technical and production departments of Wolverine Tube for the past 15 years.

New Tulsa Office—Tube Turns

The Tulsa office of TUBE TURNS, INC., has been moved from 317 South Detroit Avenue to 420 Wright Building. ROBERT S. TYLER, JR., is manager of the company's Tulsa office.

◆

New Directors Named by Atlantic Steel

Three new directors of Atlantic Steel Company, Atlanta, were elected at a recent meeting of the Company's stockholders. They are: C. B. MCMANUS, President of the Georgia Power Company, and two Atlantic Steel Vice Presidents, JOSEPH H. GIRDLER and HOWARD B. JOHNSON.

Girdler, a graduate of Lehigh University, came to Atlantic Steel in 1941. Prior to his election as a Vice President in 1949, he served as Open Hearth Superintendent. He is now Vice President in Charge of Operations.

A graduate of Georgia Tech, Johnson has served the Company in various capacities since 1933. He was elected a Vice President in June, 1946, and is now Vice President in Charge of Sales and Finance.

The stockholders re-elected all officers of the Company. Other officers are: CHARLES F. STONE, Chairman of the Board; ROBERT S. LYNCH, President; WILBUR GLENN, Vice President; C. H. CANDLER, JR., Secretary; GILBERT PURVIS, Treasurer; and ROBERT S. STRADLEY, Assistant Secretary and Assistant Treasurer.

◆

BS&B Appoints Roney—Florida

JOHNSON RONEY II has been appointed FLORIDA representative for BLACK, SIVALLS AND BRYSON, INC., manufacturers of oilfield equipment and products for chemical, foundry, and grain feed industries.

Mr. Roney is located at 608 Oak Avenue, Clearwater, Florida. He has had more than thirty years of experience in engineering and sales including RCA, General Electric, DuPont, and Hercules. Mr. Roney was sales manager for La Bour Company, Inc., and has since served as sales representative for manufacturing equipment firms. He will handle Safety Heads and related products for BS&B.

Chain Belt Appoints Little Rock Distributor

ARKANSAS BEARING COMPANY, Markham & Rector Sts., LITTLE ROCK, ARK., has been appointed by the CHAIN BELT COMPANY of Milwaukee as a distributor for the merchandise products of the Chain and Transmission, Baldwin-Duckworth, and the Conveyor and Process Equipment Divisions of the company.

◆

Ironton Fire Brick Elects Myers and Bales

THE IRONTON FIRE BRICK CO., Ironton, Ohio, has elected C. E. BALES as president of the company, to succeed E. F. MYERS who is now chairman and treasurer. Mr. Myers continues his office in JACKSONVILLE, FLORIDA, to serve his friends in the Southern power plants.

◆

Stone and Webster Vice President

STONE & WEBSTER ENGINEERING CORPORATION announces the election by its Board of Directors of WILLIAM F. RYAN as Vice President of the Corporation.

Mr. Ryan, broadly experienced in the power, industrial and chemical engineering fields, joined the organization in 1929 as a mechanical engineer, subsequently being responsible for the design of several heavy chemical plants and a number of steam power stations for public utility and industrial clients.

He became Assistant Chief Mechanical Engineer in 1941, Assistant Engineering Manager in 1945, and Engineering Manager in 1948. As Engineering Manager, he will continue to be responsible for the activities of the Engineering Department with his headquarters in the Boston office.

Republic Rubber—Houston

BRIGGS-WEAVER MACHINERY CO., 300 So. Wayside Dr., HOUSTON, TEXAS, has been appointed an Accredited Distributor of the REPUBLIC RUBBER DIVISION, Lee Rubber & Tire Corporation.

Briggs-Weaver represents Republic in the Houston and surrounding area. To service Houston industrial plants, they will carry complete stocks of belting, hose and packing.

◆

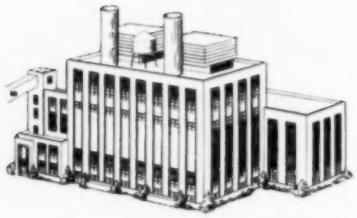
Westinghouse Productive Power Show Goes on Road

Productive Power, a traveling show to demonstrate how industry can do its work better, faster, and cheaper electrically, went on the road in February. Produced by Westinghouse Electric Corporation, the show will be sponsored by public utilities for their industrial customers in 125 cities throughout the United States. The first showing was in Akron, Ohio, and the show will continue until the final demonstrations are given on the Pacific Coast early in 1951.

The show starts with a graphic demonstration of the effects of wire size and circuit protection in factory distribution systems. Effects of low power factor and its correction by the use of capacitors are shown on an actual circuit carrying power. Lighting problems and how they affect production in the plant are discussed and demonstrated.

Effects of air pollution by smoke and dust on manufacturing processes are described and the use of electrostatic air cleaners is shown by a working model. The speed of infra-red heat for drying paint is compared with other methods. Three boards painted simultaneously before the audience are dried by forced air, by an electric strip heater, and by infra-red lamps. Only the board exposed to the infra-red lamps dries during the five-minute demonstration.

Spot welding of two pieces of steel illustrates the ease and speed of modern resistance welders. A movie shows furnace brazing and radio-frequency heating in production lines of actual plants. The strength of multi-layered plywood with joints dried on the stage by dielectric heat is demonstrated. The wood splinters before the bond breaks after only thirty seconds of heating.

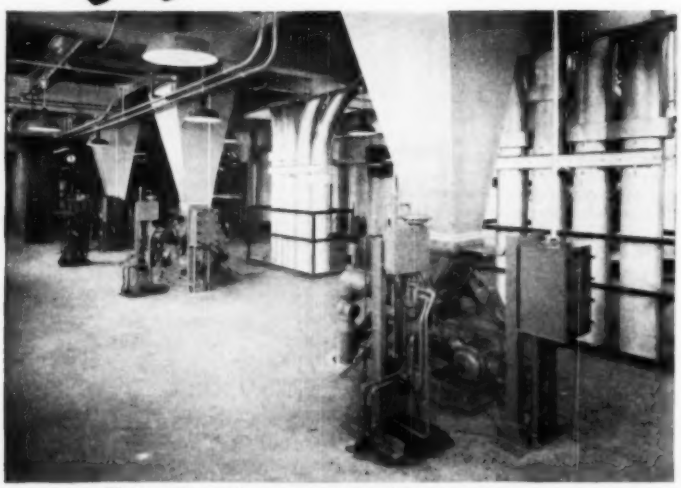


● at the New GADSDEN

Steam Plant of the

Alabama Power Company

Efficiency HAS BEEN



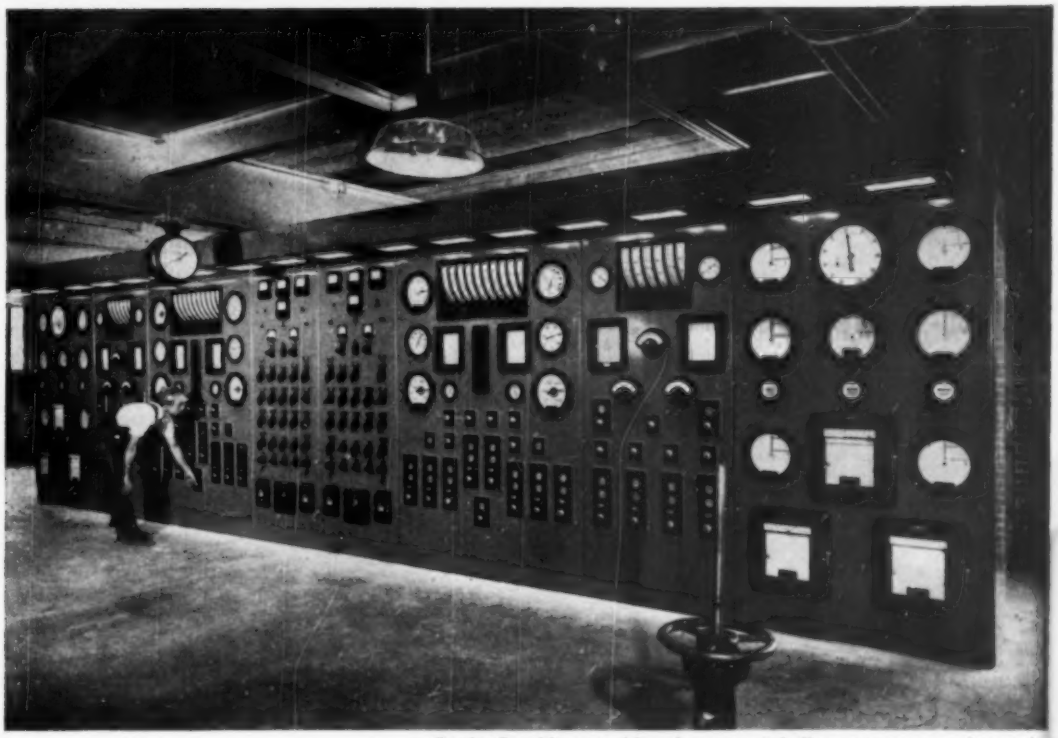
Three of the coal feeders and Republic regulators serving one of the boiler units.

It is the policy of Alabama Power Company to generate, transmit and distribute electricity to its customers at the lowest cost consistent with good service.

When designing the new 120,000 kw. Gadsden Steam Plant, the Alabama Power Company, in keeping with this policy, incorporated proven engineering developments which contribute to economical power generation. High among these was REPUBLIC automatic boiler control.

Two steam generators, each with a capacity of 600,000 pounds of steam per hour, and operated at 875 psig. and 885°F, supply steam to the two turbines. Fuels used are natural gas or pulverized coal, either singly, or in combinations.

The REPUBLIC control board is



On this Republic control board are mounted all gauges, meters and controls for operating each of the two boilers and their auxiliaries.

MADE *Automatic*

made up of one electrical panel, one recorder panel and two combustion control panels per boiler. All panels are joined together to form one continuous board for the two boilers. The boilers are rubber mounted to reduce vibration, are gray in color, and lighted from an overhead canopy.

The REPUBLIC combustion control system receives its initial impulse from the main steam line through the master controller which establishes a pneumatic loading pressure proportional to the boiler load. The loading pressure is transmitted to the variable speed coal feeders, and to the gas flow valve when burning gas in combination with coal. This pressure is also transmitted to the air flow regulator. A corrector regulator provides means for maintaining the proper steam flow air flow relationship. Provision has also been made for manually adjusting this ratio from the boiler panel.

Air flow and furnace pressure are regulated by hydraulic coupling speed, but fan damper controls are provided for use at extremely low loads, when the fan speed would be reduced below 30% of the motor drive speed.

The boiler feedwater pumps are equipped with REPUBLIC automatic minimum flow hand reset valves. These valves open when the flow through the pumps is 150 gpm or less and by-pass this amount of water to the deaerating heater.

The REPUBLIC feedwater regulator is located on the operating floor and can be manually operated during emergencies from the boiler control panel. The valve control is pneumatic, single element, but the valve is operated by a hydraulic cylinder.

For complete information on REPUBLIC automatic boiler control write for Data Book No. S-21.

REPUBLIC FLOW METERS CO. ● 2240 DIVERSEY PARKWAY • CHICAGO 47, ILLINOIS

Church and Gatling Appointed to Westinghouse Southeastern Posts

MR. O. O. RAE, manager of the Westinghouse Electric Corporation's Southeastern District, announced the appointment of MR. R. B. CHURCH, JR., as assistant to the district manager, and MR. B. M. GATLING, JR., as central station division manager. Both men will be located in Atlanta.

Mr. Church attended Northeastern University and joined Westinghouse in 1924. Since that time, he has held various supervisory positions with the company in Boston and Atlanta. Prior to his present assignment, he was office supervisor, apparatus sales department, Atlanta office. He succeeds Mr. John Gelzer, Jr., who retired.

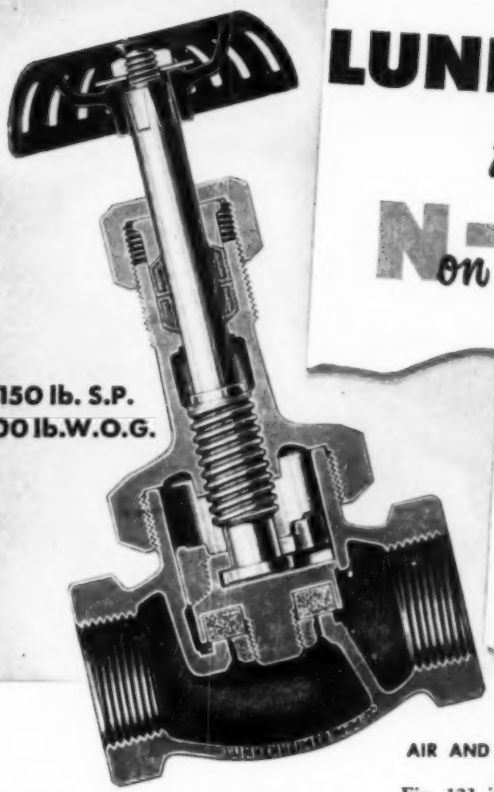
Mr. Gatling, a graduate of North Carolina State College, joined Westinghouse in 1922. Upon completion of the graduate student course and the power sales course, he was assigned to the Charlotte, N. C., sales office. His later assignments with the central station division were in the Florida and Georgia branches of the Southeastern District.

◆

Allis-Chalmers Service Shop—Tulsa

The SMITH-MILLIGAN ELECTRIC COMPANY, 624 East Third St., TULSA, OKLA., has been named a certified service shop for Allis-Chalmers motors and controls in the state of Oklahoma east of and including Kay, Pawnee, Creek, Okfuskee, Hughes, Coal, Atoka and Bryan counties. C. G.

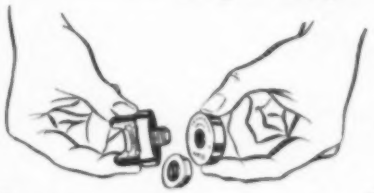
A versatile valve for general service . . .



150 lb. S.P.
300 lb.W.O.G.

LUNKENHEIMER
Figure 123
N-M-D
Non Metallic Disc

The valve with the quick-change disc



STEAM • HOT WATER • COLD WATER
AIR AND GAS • GASOLINE • OIL • BUTANE • PROPANE

Ultra-modern Manufacturing Facilities

From raw material control to final testing, new machinery, methods and research improve the quality and speed the making of Lunkenheimer Valves. New production equipment, like the group of medium ram type turret lathes shown here, is but a small part of Lunkenheimer's extensive improvement program to provide users with the best possible valve service.

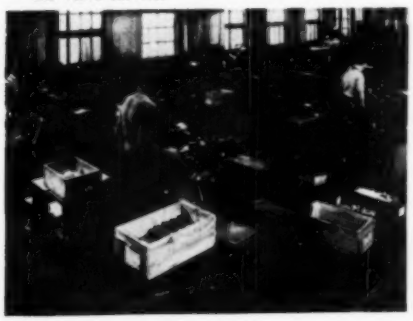


Fig. 123 is an exceptionally rugged valve . . . available with various types of discs especially compounded to give top results on the services for which they are recommended. Discs can be renewed or interchanged quick as a wink, insuring long-time satisfactory valve service with negligible maintenance expense. Disc holder is slip-on type, perfectly guided. Hexagon head gland is an aid to easy repacking. A further economy feature is the distinctive, long-wearing stem material developed by Lunkenheimer, eliminating stem-thread failure due to wear.

The "N-M-D" valve is also regularly available in angle, check and quick operating patterns. Circular No. 558, descriptive of the complete line, is yours for the asking.

N. M. D. and other Lunkenheimer Valves are available in all industrial centers. You can depend upon your Lunkenheimer Distributor for prompt service on your requirements.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

—"QUALITY"—

CINCINNATI 14, OHIO, U.S.A.

NEW YORK 13 • CHICAGO 6 • BOSTON 10 • PHILADELPHIA 34

EXPORT DEPT. CINCINNATI 14, OHIO, U.S.A.

SMITH is president and J. C. MILLIGAN, secretary and treasurer of the concern, which was organized in 1927.

◆

Plibrico Appoints Beane—West Virginia

CODY R. BEANE has been appointed manager of the PLIBRICO SALES & SERVICE CO., 1315 Hansford St., CHARLESTON 1, WEST VIRGINIA, according to an announcement by THE PLIBRICO JOINTLESS FIREBRICK CO., Chicago, Ill. Mr. Beane succeeds the late Joseph S. Stanley who died on January 16 after serving as representative for the company for over 20 years. Mr. Beane will act as distributor of refractory products, maintaining a complete boiler setting and installation service.

◆

New Quarters for McBurney—Atlanta

MCBURNEY STOKER AND EQUIPMENT COMPANY, previously located at 565 West Peachtree St., N. E., has moved into new quarters at 2110 Peachthree Road, N. E., Atlanta, Georgia.

The building at the new location was purchased in 1949 and many improvements have been made to the production, storage, and office space. Now 10,000 square feet is enclosed in the modern steel and concrete building, and 14,000 square feet of paved yard area is available for parking. Offices, shop, and warehouse are all in this building. A complete stock of all parts for all stokers manufactured by the company in the last 20 years is carried.

The company has been building McBurney under feed coal stokers for over 20 years and for the past three years has been building McBurney automatic wood refuse burners that will burn sawdust, shavings, and other refuse, all of which comply with the city smoke ordinances in every city.

McBurney has been selling and servicing Copes feedwater regulators for 34 years. They also handle complete boiler trimmings by Wright-Austin of Detroit, including water columns and float and bucket traps, which are carried in stock. They maintain a stock of Nicholson Thermostatic Traps and carry over 100 Clarage fans and motors of various capacities.

For Melting Non-ferrous Metals In Any Furnace--

--NORTON Refractory Cements

For melting all non-ferrous metals — in high frequency and induction furnaces, pit furnaces, direct arc type rocking furnaces — Norton Company offers a complete line of high temperature cements and prefired shapes. **Fused magnesia cements** for lining Ajax-Northrup high frequency furnaces melting nickel-chromium alloys; **silicon carbide mixtures** for ramming into oil or gas fired reverberatory and pit furnaces melting aluminum, copper and zinc; **fused alumina cements** for lining burner tunnels in gas or oil fired billet heating, heat treating and annealing furnaces; **fused magnesia cement** for rammed linings in Ajax-Wyatt low frequency vertical ring induction furnaces melting high copper alloys, and cupro-nickel, nickel-silver and cadmium-bronze alloys.

NORTON REFRACTORIES®

NORTON COMPANY
WORCESTER 6, MASSACHUSETTS

INDUSTRIAL EXPOSITION

WHAT: Houston Industrial Exposition
WHERE: Coliseum, Houston, Texas
WHEN: May 10-14, 1950
WHO: Regional and national manufacturers of industrial equipment and supplies
INFORMATION: Write E. G. Lenzner, General Manager, Houston Industrial Exposition, 41 San Jacinto St., Houston, Texas

◆

E. F. Drew Appoints Matthews—North Carolina

M. M. MATTHEWS has been appointed resident engineer for E. F. DREW & CO., INC., in the State of NORTH CAROLINA.

Mr. Matthews has a chemical engineering degree from the University of North Carolina and has had considerable experience with water treatment and power plant operation. He was formerly with the Ecusta Paper Company.

Territory to be covered by Mr. Matthews includes North Carolina and part of South Carolina and Tennessee.

TECHNICAL BOOKS

Oil Burners

BY KALMAN STEINER
PUBLISHED BY MCGRAW-HILL BOOK CO., 330 West 42nd Street, New York 18, N. Y.
6 x 9 inches—502 pages.
Price, $6.50.

This second edition is designed to provide up-to-date information on fuel oil, oil burners, and oil burning to those interested in the design, production, installation, operation and maintenance of industrial oil burners.

Subjects covered are: fuel oils—characteristics, specifications, combustion, and handling; electronic control methods; refractories; capacity of boilers and warm-air furnaces; draft and combustion control; building temperature control methods and fluid flow. New illustrations cover latest developments in equipment, installing methods, and operating systems.

The book furnishes on-the-job technical information on liquid fuels and the equipment used for burning them with safety and efficiency.

NEW EQUIPMENT for Southern Industry

Hardness Determination in Water

E-1 THE ELGIN SOFTENER CORPORATION, 132 N. Grove Ave., Elgin, Ill., has announced a new rapid method of determining hardness in water. In use for the past year in Elgin laboratories, the Versenate method is claimed to be faster and more accurate than the conventional soap method and is as simple to run as is an alkalinity titration.

For general data on standard solutions, indicators, reagents, and procedure, circle item number E-1 on the free service coupon postcard on page 17.

◆

Casting Machine

E-2 THE CENTRIFUGAL CASTING MACHINE COMPANY, P. O. Box 947, Tulsa, Okla., announces the new Model F Permanent Mold Casting Machine, which can be used for production of castings poured of steel, case iron, malleable iron, nodular iron, brass, bronze, magnesium, and aluminum.

The new machine makes it possible for the operator to place the core in the drag half of the permanent mold while the parting line is in a horizontal plane. Either dry sand or green sand cores may be used. If green sand cores are used, it is usually advisable to use an arbor. After the core is placed in the drag half of the mold, the mold is closed, then rotated to the pouring position. After pouring, the mold is rotated back to the horizontal position, the cope raised, and the casting lifted out of the drag. The mold is blown out, sprayed, and ready for a new core. According to the manufacturer, a production of 20 to 40 casts per hour can be obtained, depending upon size and type.

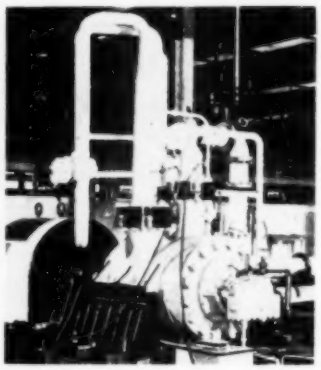
The machine is supplied complete with all accessories such as permanent molds, coreboxes, arbors, spraying equipment, spray wash. Ask for bulletin No. 149.

◆

Re-Entry Pumps

E-3 BYRON JACKSON PUMP DIVISION PLANT, Los Angeles, Calif., is now producing a combination of primary and secondary pumps built into one unit. These re-entry type pumps are designed to reduce installation space without introducing unusual maintenance problems and to provide savings in first costs by space saving and elimination of one driver per unit.

Two of these units have been built recently at the plant. Discharge pressure is 1570 psi and the total capacity is 1980 gpm. The pumps are driven by 2,025 hp steam turbines turning at 5,000 rpm. In the primary section, the water is pumped at 255 F. In the



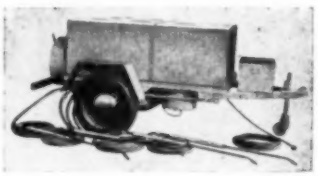
secondary section the water is pumped at 465 F. The pumps are completely packless. The method of construction eliminates one set of bearings and one set of stuffingboxes. Part of the preheating is accomplished between the primary and secondary sections, thus making it possible to employ low pressure heaters.

◆

Steam Cleaner

E-4 HOMESTEAD VALVE MFG. CO., Coraopolis, Pa., has announced a new Super-Duty Hypressure Jenny Steam Cleaner designed and built to do cleaning jobs and for heat transfer uses.

It is applicable for cleaning grease, grime and dirt from machinery and equipment. Its 300 gph capacity will operate from one to four cleaning

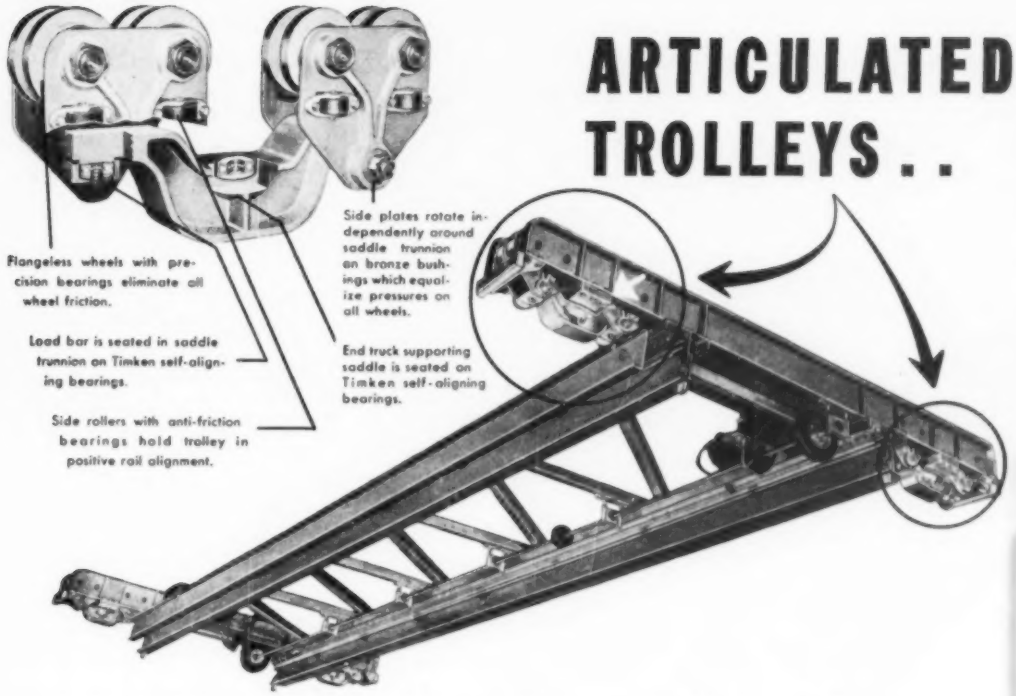


guns. It is designed for rapid operation.

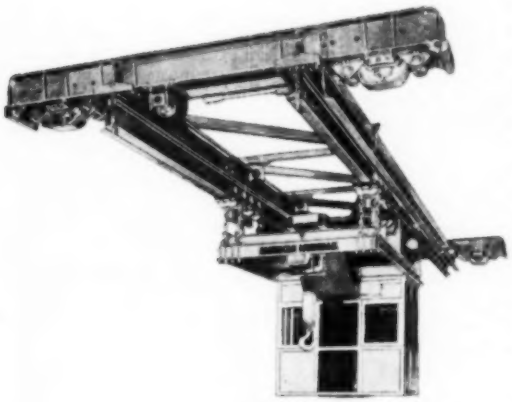
The unit can be changed over for use as a heat generator, with heat

Free additional information is available to readers of Southern Power & Industry. Check item code number on the postage free service coupon post card provided on p. 17.

ARTICULATED TROLLEYS . .



makes possible High-Speed, Heavy-Service
AMERICAN MONORAIL CRANES



When each trolley wheel carries its share of the load in perfect alignment with the craneway tracks and all possible friction is eliminated, the result is perfectly articulated trolley travel.

Applied to American MonoRail Cranes, these articulated trolleys permit operating speeds of 500 feet per minute . . . constant service . . . handling loads up to 10 tons. And with this is offered all the flexibility of MonoRail design for *interlocking carrier service between and beyond the craneways.*

Let an American MonoRail Engineer explain all the advantages of these new cranes. Write for Bulletin MF-1 showing the development of American MonoRail Cranes for over-all plant service at low initial and operating costs.

THE AMERICAN MONORAIL COMPANY

13105 ATHENS AVENUE **CLEVELAND 7, OHIO**

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

output equivalent to a 25 hp boiler. Change is made by loosening two bolts and reversing crank arm. The unit is then ready for such jobs as heating tanks of viscous fluids, etc.

The Super-Duty Hypressure Jenny is made in trailer mounted, portable, and stationary models. Standard equipment includes cleaning gun, vapor hose, and a choice of either gasoline engine or 1 hp electric motor.

◆

Scoop-Shovel

E-5 THE YALE & TOWNE MFG. Co., Roosevelt Blvd. and Haldeman Ave., Philadelphia 15, Pa., announces a new hydraulically - operated Scoop - Shovel designed to eliminate manual shoveling when scooping, lifting, moving, and dumping sand, coal, gravel, grain, dry chemicals and similar loose materials.

The accessory can be attached to the Lift King and Worksaver electric and gas fork trucks for operation within the plant, plant yard, box cars, and truck trailers. It handles up to 27 cu ft of material. It tilts upward from the horizontal scooping position to cradle the load during transport, and tilts downward to completely dis-

charge the load when dumping. The device scoops at the ground level or digs into piled material. It dumps loads into bins or other receptacles up to 130 inches in height.

Compare the

LINK-BELT "100"

Conveyor Idler Construction Features

Complete Line of Idlers
Troughing Idlers — illustrated above

Rubber-Tread Impact Troughing Idlers — recommended for use at loading points of the conveyor, especially when large lumps and heavy or coarse materials are being handled; to provide a cushion to absorb the impact of the material and protect the belt against bruising or tearing.

Positive Action Self-Aligning Idlers — for non-reversible belts. Should be spaced intermittently in both the carrying and return runs to automatically position the belt on the conveyor idler roadbed correcting misalignments due to off center loading, strong side winds, or unequal belt stretch. Counterweighted-Disc Self-Aligning Idlers for reversible belts are also available.

Return Idlers—have same smooth rounded-edge outer shell and interior construction as the troughing rolls, your assurance of an efficient return run with minimum belt wear.

Rubber Tread Return Idlers — for use when handling a wet or sticky material that clings to the belt, as these idlers induce a bending or kneading action to the belt which breaks the material loose. Also ideal for use when handling a material that has a corrosive action on iron or steel.

Link-Belt builds many types and designs of idlers for special services in addition to those illustrated. Refer your belt conveyor idler problem to Link-Belt for sound solutions.

For more than half a century, the name LINK-BELT has stood for pre-eminence in belt conveyor idlers and accessories. The original design has been steadily improved and now the Series "100" Idler offers top quality in this type of equipment. Installations have been made throughout the world and include some of the widest, the longest and the highest belt conveyors.

Link-Belt idlers offer such outstanding features: grease-in-dirt-out seal . . . rolls with smooth rounded-edge outer shell to minimize belt wear . . . high-grade roller bearings . . . interlocking nut and yokes to prevent brackets from spreading under unusual impact . . . end brackets of tough malleable iron are riveted to and extend well beyond the rigid T section cross member to provide stability and transmit load directly to steel bar feet which are welded to each end of the cross member . . . grease fittings for rolls are protected within the deep outer ribs of the end bracket and provide a convenient and safe means for lubrication.

Idlers can now be shipped from stock—full details on Series "100" Idlers are shown in Book No. 1915. It should be on the desk of every engineer using belt conveyors. Address the nearest office.

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Houston 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

11,648

LINK-BELT

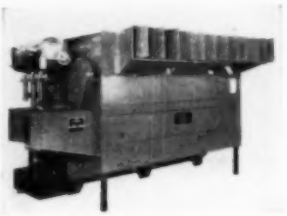
CONVEYING MACHINERY
"THE COMPLETE LINE"

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

Spray Fan Coolers

E-6 NIAGARA BLOWER COMPANY, 405 Lexington Ave., New York 17, N. Y., announces a new series of spray fan coolers for convenient installation in refrigerated rooms where high capacity is required but ceiling height is restricted.



In the new "Low Head Room" design the fan section is located on the side of the unit instead of on its top as in conventional practice. The air enters the spray section at the top; it is chilled in passing down through the spray and over the refrigerant coils; it enters the fan section at the bottom and is discharged from the side at the top. When refrigerant temperatures below freezing are used, the process is kept free from frost, ice, or from freezing by the use of brine or Niagara "No Frost" liquid in the sprays.

The application is suitable for food freezing, meat packing, cooling and freezing tunnels, and other refrigerating processes. Five unit sizes are produced at present with capacities ranging from 1680 to 11,000 cfm of chilled air. The maximum height is 72". Floor space required ranges from 16 sq ft to 72 sq ft.

◆

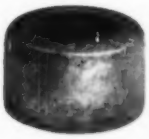
Solenoid Valve

E-7 JOHNSON CORPORATION, Three Rivers, Mich., has developed a special dash pot design in its line of direct operated solenoid valves to eliminate the water hammer that can result from the sudden closing of a valve in a high velocity pipe line.

The new valve is known as Series No. 4000, and is designed for normal-

Toothed Lock Washer: Prevents loss of stem nut due to vibration, thereby holding the handwheel securely.

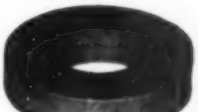
Newly Designed Handwheel: Air-cooled, finger grip handwheel affords sure grip even with greasy gloves.



Improved Packing: Molded packing of lubricated asbestos reinforced with copper wire. Suitable for practically every service. Valves can be repacked under pressure.

Hexagonal Union Bonnet Connection: Eliminates any chance of distortion or leakage even though valve is repeatedly taken apart and assembled.

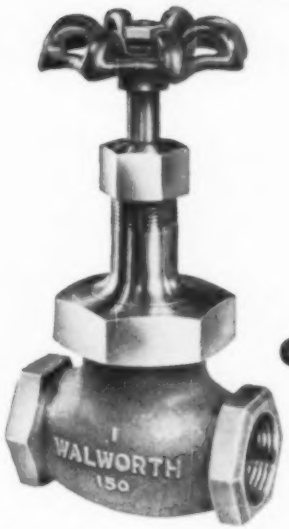
New Cylindrical Disc Holder: The design of the top portion of the disc holder keeps the disc accurately guided under all operating conditions.



Renewable Asbestos Disc: This disc is suitable for steam up to 500F and is resistant to oil, gasoline, and many chemicals at atmospheric temperatures. Discs for special services are available.

Extra Strong Body: Made of Composition M (ASTM B61) bronze thick enough to provide a high safety factor. Valves undergo hydrostatic shell test of 450 psi.

WALWORTH



IMPROVED No. 95 BRONZE GLOBE VALVE

also available in Angle Type (No. 96)

The service ratings of the Walworth No. 95 are 150 pounds per square inch steam at 500F, and 300 pounds per square inch non-shock cold water, oil, and gas. In the manufacture of this quality bronze valve, more than 47 gages are used in machining parts to micrometric accuracy, thus insuring interchangeability of parts. For further information see your local Walworth distributor, or write: Walworth Company, 60 East 42nd St., New York 17, N. Y.

note these 7 Great Features

WALWORTH

valves and fittings

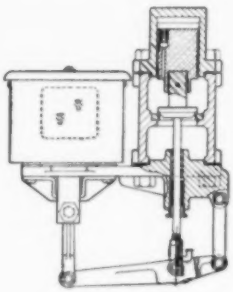
60 EAST 42nd STREET NEW YORK 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

ly closed operation. Dash pot construction consists of a bronze piston fitted within the top housing of the valve and pinned to the valve to fol-



low its movement. An upward seating ball check controls the flow through a port in this piston. When valve is opened and piston moves up, liquid above piston flows freely through the port so there is no resistance to the instant opening of valve orifice.

When valve closes, the ball check closes the port; liquid must then flow between the piston and housing, a restricted passage which slows the closing of the valve. Piston and valve are independent of the action of the valve-opening push rod.

Standard construction has cast iron body with bronze piston; all bronze can be furnished. Valve and seat are stainless steel. It is available in ¾, 1, 1¼, 1½, and 2 inch sizes.

•

Filter

E-8 THE SPARKLER MFG. CO., Mundelein, Ill., has recently introduced a new filter for fuel oil, gasoline, air, etc. One of the design features is the method by which a series of V-shaped horizontal filter discs are bolted into the cover of the filter housing to facilitate cleaning or replacing.

Each V-shaped disc consists of two perforated leaves separated at the

Look... NO STACKS!

P-D "Short Stacks" Become an Integral Part of This Michigan Power Plant


FAN STACK


PLATE TYPE AIR HEATERS


DUST COLLECTOR


THERMOBLOC INDUSTRIAL DIRECT-FIRED UNIT HEATERS


I.D. FANS

Here's modern industrial architecture at its best . . . a power plant with no protruding stacks.

This municipal power plant, close to the business district of Lansing, Michigan, was architecturally designed to give the appearance of a commercial building. Elimination of unsightly chimneys, an earmark of power plants, was accomplished by the use of specially designed P-D Fan Stacks, recessed into the actual building structure.

P-D Venturi type Fan Stacks are normally short, but these stacks were made even shorter by increasing the angle of the stack wall and dividing the stack with a baffle.

P-D Fan Stacks are a complete draft producing unit consisting of fan, breaching and stack, integrated to produce the highest efficiency attainable. Thus, predetermined draft efficiency can be guaranteed since all components are designed, engineered and manufactured by one company . . . The Prat-Daniel Corporation.

For the answer to your draft problem consult our project engineers . . . for modern, high induced draft efficiency, install P-D Fan Stacks.

Project and Sales Engineers **THE THERMIX CORPORATION** GREENWICH, CONN.

Canadian Affiliates: T. C. CHOWN, LTD., 1440 St. Catherine St. W., Montreal 25, Quebec

PRAT-DANIEL CORPORATION

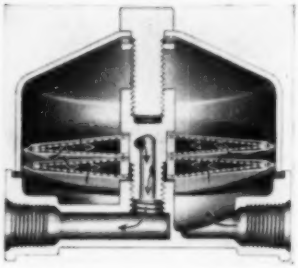
82-4 WATER STREET EAST PORT CHESTER, CONN.

DESIGNERS AND MANUFACTURERS OF POWER PLANT EQUIPMENT FOR OVER 25 YEARS

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

center by a perforated flange. These leaves are covered with various filter media, providing a wide range of porosity and degree of filtration.



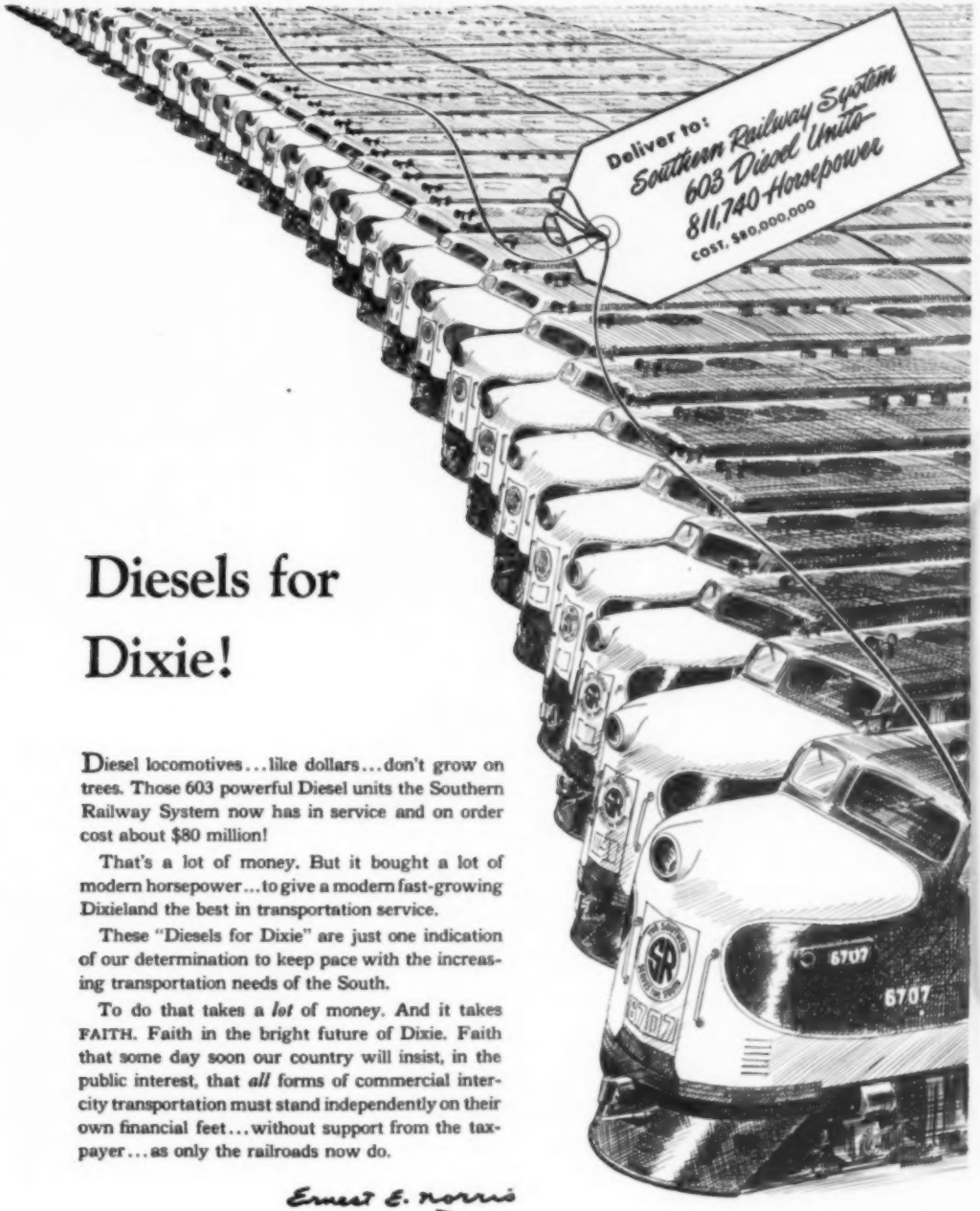
The filter is recommended by the manufacturer for removing solids down to 1 or 2 microns from liquids, for separating water from fuel oils, gasoline, etc., for separating oil from air or water, and for purifying gases.

◆

Shock Absorber

E-9 R-S PRODUCTS CORPORATION, Wayne Junction, Philadelphia 44, Pa., are producing a complete line of compact liquid shock absorbers designed to eliminate shock and hammering in pipe lines

and liquid systems. The manufacturer claims that hammering, leaky joints, opened pipe seams, and excess pressure on valve packings can be reduced to a minimum when such damage is caused by the quick closing of valves or any action that suddenly stops the flow of liquid through a pump or other apparatus. The Industrial, Dual, and Super models are designed for general industrial use.



Diesels for Dixie!

Diesel locomotives...like dollars...don't grow on trees. Those 603 powerful Diesel units the Southern Railway System now has in service and on order cost about $80 million!

That's a lot of money. But it bought a lot of modern horsepower...to give a modern fast-growing Dixieland the best in transportation service.

These "Diesels for Dixie" are just one indication of our determination to keep pace with the increasing transportation needs of the South.

To do that takes a *lot* of money. And it takes FAITH. Faith in the bright future of Dixie. Faith that some day soon our country will insist, in the public interest, that *all* forms of commercial intercity transportation must stand independently on their own financial feet...without support from the taxpayer...as only the railroads now do.

Ernest E. Norris

President

THE SOUTHERN SR SERVES THE SOUTH

SOUTHERN RAILWAY SYSTEM

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

Chemical Feeder

E-10 MANZEL, INC., Buffalo, N. Y., has announced a new chemical feeder that operates continuously with no extra attention in wet or dry oil fields.

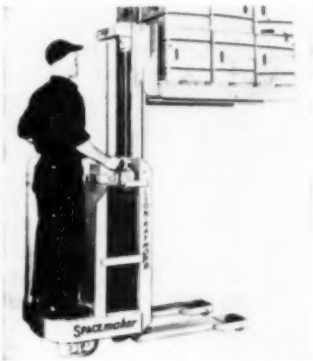
The new feeder has a built-in force feed lubrication system designed to assure complete lubrication of the waste gas-driven motors, preventing the corrosion that frequently causes stoppage and results in bad tanks of oil. It eliminates excessive manual labor.

It is available with reciprocating or rotary drive gas motor, operating on as low as 3 lb pressure. It supplies any desired amount of chemical from ½ pint per hr up. Also available is a kit for conversion of present chemical feeders to force feed lubrication.

◆

Electric Tiering Truck

E-11 LYON-RAYMOND CORP., 9066 Madison St., Greene, N. Y., has announced a new electric tiering truck designed to tier from narrow aisles and in limited areas.



The truck, known as the "Space-Maker", is furnished in three different types: Platform type—for tiering skids; Fork type—for tiering single face pallets; Straddle type—for tiering two faced pallets. It is suitable for use in warehouses and manufacturing plants. Additional information is available from the manufacturer.

Underfeed Oiler

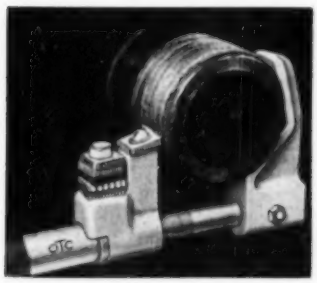
E-12 TRICO FUSE MFG. CO., 2948 No. 5th St., Milwaukee 12, Wis., is producing underfeed oilers for lubricating bearings and shafts requiring a very small amount of oil.

The oiler is mounted at the bottom of the bearing. One end of the solid felt wick is held in contact with the shaft by positive spring action. The other end rests at the bottom of the oil reservoir. Oil is raised by capillary action to the tip of the wick where it is distributed along the shaft. Oiler stops feeding when machine is not in motion. A clear plastic bottle keeps the oil supply visible. Metal parts are plated for corrosion resistance and easy cleaning. The oiler is available in 1, 2, and 4 oz capacities.

◆

Thread Restoring Tool

E-13 THE OWATONNA TOOL COMPANY, 395 Cedar St., Owatonna, Minn., has announced an adjustable hand thread chaser to restore battered or crossed threads



quickly and easily. This tool can be adjusted to any diameter from 1¼" to 5". It is suitable for use on axle housings or shafts, bearing cages, couplings, pipes, etc. The thread chaser eliminates the necessity of machining such parts.

The tool comes equipped with six chaser dies which carry 16 thread pitches.

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

Compressors

E-14 YORK CORPORATION, York, Pa., has developed a new line of high speed refrigeration compressors for ammonia application to handle from 15 to 275 hp equivalent of refrigeration.

The new line, known as V/W compressors, is said to result in greater freedom from vibration. Cylinder liners and all other parts subjected to wear can be removed for replacement, and most parts on the various size compressors are interchangeable.

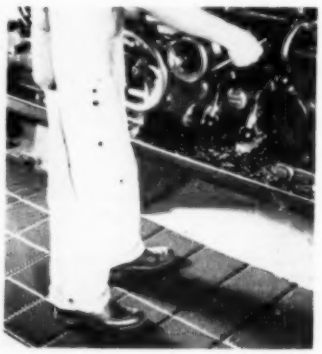
The compressors are designed for economy of floor space and head room. Quiet performance is made possible by precision built ring plate type suction and discharge valves. Starting power requirements are reduced by automatic unloading of cylinders.

The ammonia V/W compressors are available for use with remote condensing equipment (either water cooled or evaporator cooled condensers) to meet refrigeration needs in the range of 15-275 hp. They are designed with 4, 6, 8, 12, and 16 cylinders and for direct connection to motor.

◆

Industrial Rubber Mat

E-15 PATTERSON-BALLAGH, Division of BYRON JACKSON CO., Dept. 21, P. O. Box 2493, Terminal Annex, Los Angeles 54, Calif., has announced a tough oil-resistant rubber mat for industrial use. It is applicable to use by operators of



drill presses, latches, and other shop machinery.

Several mats may be laid together to cover large working areas or they may be cut apart to surface stairs and other small areas. Pattern design features large rubber blocks with a non-skid surface. The mat is grooved on the underside to prevent slipping under wet or oil conditions. The over-all size is 32" x 32", and the price is $5.00.

◆

Pipe and Duct Insulation

E-16 ALFOL DIVISION OF REFLECTAL CORP., 155 East 44th St., New York, N. Y., is producing a new insulating material for sheet metal ducts and steam pipes.

The manufacturer points out that, due to light weight and easy handling characteristics, Alfol asbestos insulation will cost less than 6 cents per square foot on normal applications.

The product is made of sheet or corrugated asbestos firmly bonded to a sheet of pure aluminum foil that is said to reflect 95 per cent of all radiant heat, thereby doing the job without requiring bulk. The sheets are fitted to pipes or ducts with a slight overlap, secured by standard insulation bands.

Literature and samples are available from the manufacturer.

◆

Elevator Chain

E-17 BEAUMONT BIRCH CO., 1505 Race St., Philadelphia, Pa., is producing "Beaucalloy" elevator chains, made of a heat treated alloy steel.

Design features include: projecting guards which deflect material from chain joints; slotted boss ends which prevent pin from rotating and protect cotter pin from wear; connecting pins made of heat treated alloy steel and which have a centerless, ground finish that greatly reduces friction; a single link barrel cast integrally with side bars and made of Beaucalloy steel; a barrel larger in size and 3/16" thicker on the side which receives wear from the connecting pin and wheel; and a special K-2 attachment which permits use of either new style dove-tail lock buckets or conventional type buckets.

FREE READER SERVICE

To obtain free information on this equipment, circle number on the page 17 free post card.

Miniature Speed Changers

E-18 METRON INSTRUMENT COMPANY, 432 Lincoln St., Denver 9, Colo., is producing a line of miniature speed changers which make gear reductions as high as 750,000 to 1 available. These units are made up by adding one or two additional gearing sections to the standard three-section units having ratios up to 3375 to 1. This provides several hundred ratios between 1000:1 and 750,000:1 in addition to (500 or more) standard 1, 2 and 3 section units.

Input speeds as high as 50,000 rpm, and output torques up to 2 pound-inches are permissible. Very high ratios in hobbed gears and "zero Backlash" construction can be furnished at reduced torque rating. Weights of 4 and 5 section units are approximately 6 and 7 ounces. Body diameter is 1.050 inches; body lengths are 3 5/16 in. for 4 section unit and 4¾ in. for 5 section units.

◆

Side-Shifter Attachment

E-20 THE YALE & TOWNE MFG. CO., Philadelphia Division, Roosevelt Blvd. and Haldeman Ave., Philadelphia 15, Pa., announces a new hydraulically operated side-shifter attachment designed for use with both their Lift King and Worksaver fork trucks. The device shifts the forks as much as 4 inches to the right or left of center. This increased flexibility saves storage space by making it possible to spot loads in odd corners, close to walls, and in other confined areas. It is applicable in such enclosed spaces as trailer trucks and freight cars. The side-shifter is said to be easily removed from the trucks to permit installation of other accessories.

Heat Exchangers

E-19 YOUNG RADIATOR COMPANY, Racine, Wis., has expanded its redesigned line of heat exchangers with the addition of its new Type "R" (removable tube bundle) shell and tube heat exchangers.

These units are of corrosion-resistant Admiralty metal tubing. The line consists of both single and two-pass models in a wide range of capacities.

The units have been especially designed for: Engine Cooling—engine jacket water and lubricating oil; Oil Cooling—bearings, machine tools, reduction gears, pumping units, turbines, cutting oil, quenching oil, transformers, industrial hydraulic equipment, generator sets; and miscellaneous fluid cooling—fresh water, salt water, torque converter fluid.

For information on how the side-shifter can be applied to present equipment or for data on new side-shifter equipped trucks, write to the manufacturer.

•

Quality Control Indicator

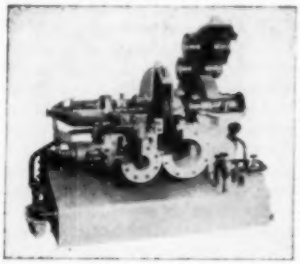
E-21 GENERAL ELECTRIC COMPANY, Schenectady 5, N. Y., has recently developed a new device which they say can be instrumental in assuring the highest possible quality of most mass-produced items at reduced costs.

The instrument is an electric computor called a "quality control indicator". It keeps an automatic, continuous check on reject rates in manufacturing operations and makes possible the location and remedy of abnormal production difficulties as they occur.

In practice, the indicator uses various signalling devices, such as an "electric eye" or a switch tripped by passing objects, to count the number of articles produced. Every time an inspector rejects a unit, he pushes a button, and this causes a change of reading on the indicating meter. When the reject level at an inspection station exceeds a predetermined rate, the needle on the meter moves from th green half of the scale to the red half, indicating to supervisors that corrective action is needed. The indicating equipment need not be set up near the production line, but may be installed in the offices of supervisory personnel. It may be used on any production line, wherever continuous inspection and testing are required.

Gearturbines

E-24 WESTINGHOUSE ELECTRIC CORPORATION, P. O. Box 2099, Pittsburgh 30, Pa., announces Type E industrial steam turbines with close-coupled, integral gears for low-speed applications. Equipment such as pumps, fans, compressors, and generators can be driven at their proper speeds by these Gearturbines while the turbines operate at their most efficient speed.



The new units combine a compact speed reduction mechanism coupled to the Type E turbine and designed to operate as a single unit. Single helical gears with low helix angle give low thrust against bearings. Turbine and gear are factory aligned on a single plate steel base which also serves as an oil tank. The Gearturbine is shipped as a completely assembled unit ready to install.

•

Belt Feeder

E-25 RICHARDSON SCALE CO., Clifton, N. J., has placed on the market a compact, totally enclosed, yet fully accessible belt feeder for easy installation in tight places.

Originally designed to deliver a continuous stream of material from an intermittently discharging automatic bulk scale, this unit has a wide range of applications as a feeder or "take-away" conveyor. A variable speed drive can be furnished which is automatically adjustable to vary the stream in conformity with the timed discharges of the automatic scale above and so maintain a continuous, accurately weighed stream. It also features cantilever pulleys for endless belting, removable skirt plates, and streamlined appearance.

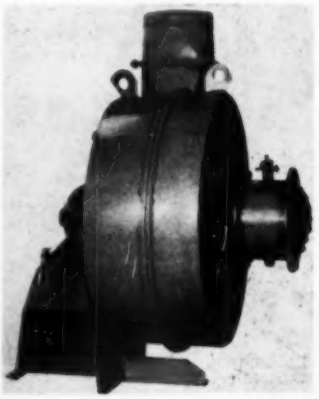
The feeder is available in lengths of from 18 to 60 inches, and in stream widths of 2, 4, and 6 inches with a rated capacity up to 1,500 cu ft per hour. Belt speed is from 0 to 200 ft per minute. It can be driven by a single speed motor at either end; from

line shaft; or by special variable speed drive when specified. Manual control, or a special remote control up to 30 starts per minute, is also available.

◆

Large Volume Blowers

E-26 The North American Mfg. Co., 4455 East 71st St., Cleveland 5, Ohio, has recenly added to its production line seven new blower sizes to further round out the line of blowers known as the "300" series. These units are of large volume, low pressure type and come in either single or two-stage units. They may be obtained in the directly connected style or with V-belts transmitting the power from the motor to the blower impellers through a jackshaft.



Four-ounce blowers give 4000 and 4700 cfm with 7½ and 10 hp 1750 rpm motors respectively. Eight-ounce blowers give 2480, 4250, and 4800 cfm with 10, 15 and 20 hp 1750 rpm motors. Two blowers with 50 and 60 hp 3600 rpm motors give 6000 and 7560 cfm respectively.

◆

Sight Savers

E-27 Dow Corning Corporation, Midland, Mich., announces the availability of Sight Saver tissue dispensers for plant and office use. The container holds a normal month's supply of 3 x 7 inch Sight Saver tissues to keep eyeglasses and goggles clean.

The tissues are impregnated with a special silicone that gives added clarity and luster to glass. This silicone also forms an invisible coating that protects the surface and prevents the adherence of most organic materials.

CATALOGS AND BULLETINS

(Continued from page 10)

B-10 FURNACE INSTALLATIONS—Catalog, 40 pages—Describes Abco furnace and boiler settings in Southern industrial plants. Installations designed to convert waste materials into low-cost steam. 7-page section on Acme designed arches and supporting walls.—ABCO FURNACE DIVISION, ACME BRICK COMPANY, Fort Worth 3, Texas.

B-11 PNEUMATIC TOOLS—Catalog 47, 34 pages—Describes Cleco pneumatic tools for industry—heavy grinders, sanders, buffers, rotary file and burr machines, drills, reamers, screwdrivers, impact wrenches, etc. —CLECO DIVISION, REED ROLLER BIT COMPANY, Box 2119, Houston, Texas.

B-12 DIESEL ENGINES—Bulletin 173, 12 pages—Describes and illustrates Diesels of large capacity, 3570-8500 hp. Discusses construction, design, fuels, and applications in industrial and utilities plants.—NORDBERG MFG. CO., Milwaukee 7, Wis.

B-13 REFERENCE TABLE—Card, TDC-110—A linear conversion table for handy reference by engineers to convert inches and fractions of inches into decimal parts of a foot. Suitable for use in the application of steel tubing, etc.—THE BABCOCK & WILCOX TUBE CO., Beaver Falls, Pa.

B-14 ELECTROSTATIC PRECIPITATION—Bulletin GEA-5212, 16 pages —Illustrated with photographs and diagrams. Explains how electrostatic precipitation works; gives 7 case histories; describes various methods and equipment applicable to each method. Suggests application in acid plants, blast furnaces, carbon-black plants, power plants, pulp and paper mills; textile mills.—GENERAL ELECTRIC CO., Schenectady 5, N. Y.

B-15 CHLORINE HANDBOOK — Booklet, 44 pages—Basic data covering the safe storage, handling, and use of chlorine, as well as its physical properties. Illustrated with charts, drawings, tables, and photographs. Of interest to chemical and metallurgical engineers, works managers, superintendents, and other plant personnel.—DIAMOND ALKALI COMPANY, 300 Union Commerce Bldg., Cleveland 14, Ohio.

B-16 WELDERS—Booklet DB 26-100—Describes new 200, 300, and 400 amp, 60 per cent duty cycle, selenium rectifier d-c welders. Discusses power costs, performance characteristics, construction details, electrical characteristics, welding characteristics, dimensions, and weights. Graphs of kva input, efficiency and power factor at welding currents up to full load are included.—WESTINGHOUSE ELECTRIC CORP., Box 2099, Pittsburgh 30, Pa.

B-17 AUTOMATIC BLOW CASE—Part 3, Section 2, Catalog 54, 10 pages—Describes automatic blow case including how it can be used, blow case operation, and specifications. Illustrated.—BLACK, SIVALLS & BRYSON, INC., 720 Delaware, Kansas City 6, Mo.

B-18 VALVES—Selection Chart and Bulletin No. 148, 24 pages—Chart designed for easy selection of the correct valve. Used in conjunction with Klipfel Reducing Valve Bulletin No. 148, chart also helps determine proper sizes of valves.—KLIPFEL VALVES, INC., Division of HAMILTON-THOMAS CORP., Hamilton, Ohio.

B-19 LOW TEMPERATURE WELDING—Catalog, 32 pages—Illustrated booklet lists All-State rods and fluxes. Contains tables of characteristics, application information, and data of general interest to workers in the metal-joining industries.—ALL-STATE WELDING ALLOYS CO., INC., 272 Ferris Ave., White Plains, N. Y.

B-20 MOTOR CONTROL — Catalog, 76 pages—Reference book on modern motor controls contains condensed information, dimensions, and prices of the more popular items in the company's line.—ALLEN-BRADLEY COMPANY, Milwaukee 4, Wis.

B-21 ROTAMETERS — Bulletin 18-RD—Describes the company's complete line of Universal Rotameters, utilizing the High Capacity Fluted Rotameter tube. Contains information on operation, derivation of formula, selection, and tables on capacities for liquids and gases.—SCHUTTE & KOERTING CO., Dept. M-A, 12th and Thompson Sts., Philadelphia 22, Pa.

B-22 PORTABLE CABLES—Bulltin H-420, 56 pages—Technical information and dimensional data are given covering entire range of flexible cords and portable cables, from 300 v Type SJO cord to 15,000 v shovel cable, including welding cables, jumpers, motor leads, and others. Tables of current carrying capacities, resistance values and their correction factors are shown.—HAZARD INSULATED WIRE WORKS DIVISION of the OKONITE COMPANY, 72 Hazle St., Wilkes-Barre, Pa.

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B-23 TORQUE CONVERTERS — Booklet 24 pages—"The New General Motors Diesel Engine-Torque Converter Unit" describes complete self contained torque converter power unit and shows colored cross-sectional drawings and diagrams of the inside of the unit. Explains use in various industries.—DETROIT DIESEL ENGINE DIVISION, GENERAL MOTORS CORP., 13400 W. Outer Drive, Detroit 28, Mich.

B-24 ALUMINUM PAINTS — Folder, 4 pages—Specialty aluminum paints for maintenance are described for six different uses: for applying directly over rusted surfaces; heat-resisting for interior and exterior; acid and alkali resisting; for rusted chain link fences; and Utility aluminum paint.—THE SKYBRYTE COMPANY, 3125 Perkins Ave., Cleveland 14, Ohio.

B-25 FIRE BRICK—Bulletin 102, 6 pages —Describes high heat duty dry press fire brick for industrial use in boiler settings, open hearth furnaces, mill furnaces, glass and lime plants, and chemical plants.—LACLEDE-CHRISTY COMPANY, Ambassador Bldg., St. Louis 1, Mo.

B-26 INDUSTRIAL INSTRUMENTS — Bulletin 90-1, 32 pages—"Advanced Instrumentation for Steam-Operated Generating Stations" discusses instruments for measurement and control. The "Continuous Balance" principle is described. Construction and operation of the instruments are illustrated.—MINNEAPOLIS-HONEYWELL REGULATOR CO., BROWN INSTRUMENTS DIVISION, Wayne & Windrim Aves., Philadelphia 44, Pa.

B-27 SELF-LUBRICATING PACKINGS— Bulletin LP-10, 4 pages—Text covers principles of self-lubricating packing design, structure and performance as well as analysis of each packing from standpoint of application to specific services. Packing illustrations and specifications are included.—GREENE, TWEED & CO., Attn: Mr. Walter Josephson, North Wales, Pa.

B-28 AIR AND GAS CLEANERS—Manual 130-E, 8 pages—Covers new design in the company's Cycoil oil bath air and gas cleaners. Selection charts, dimension tables, and detailed engineering data are included.—AMERICAN AIR FILTER CO., INC., First and Central Ave., Louisville 8, Ky.

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B-29 STEAM PLANT EQUIPMENT—Bulletin 441-C, 28 pages, and 4 separate catalogs—Illustrated catalogs giving information on Steam Condensers; Steam Jet Air Ejectors; Oil and Water Coolers; Packaged Power Boilers; and Centrifugal and Piston Pumps.—CONDENSER SERVICE & ENGINEERING CO., INC., Seaboard Trust Bldg., Hoboken, N. J.

B-30 COMPRESSIBILITY CHARTS—Bulletin 7637, 25 pages—"Compressibility Charts and Their Application to Problems Involving Pressure-Volume-Energy Relation for Real Gases" is prepared for those interested in chemical and other similar process industries.—WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J.

B-31 EXPLOSION-PROOF MOTORS—Bulletin C-130, 2 pages—Describes and illustrates three classes of explosion-proof motors, placing particular emphasis on those which are made for locations where hazardous conditions exist—where gasoline, oil, naphtha, alcohols, acetone, lacquer solvent vapors and natural gas are present.—RELIANCE ELECTRIC & ENGINEERING CO., 1111 Ivanhoe Road, Cleveland 10, Ohio.

B-32 ELECTRODES—Catalog EW-149, 16 pages—Contains description, data on application, welding procedure, mechanical properties, and specifications of Hobart line of electrodes.—HOBART BROTHERS COMPANY, Troy, Ohio.

B-33 BLOWER — Publication No. 86, 4 pages—A selection chart which lists the various capacities possible in the Standardaire Blower when direct connected to standard speed motors.—THE STANDARD STOKER COMPANY, INC., 370 Lexington Ave., New York 17, N. Y.

B-34 POWER TRANSFORMERS—Bulletin 61B6084A, 28 pages—Features of the small power transformers described include: core and coil unit; no-load tap changer; tank construction; cooling methods; oil preserving systems; bushings; terminal compartments; indicators and testing of single phase transformers; 69,000 volts and below—up to 5,000 kva. and three-phase transformers, 69,000 volts and below—up to 15,000 kva.—ALLIS-CHALMERS MFG. CO., 954 S. 70th St., Milwaukee, Wis.

B-35 SHOVEL-CRANE — Catalog 2322 — Contains applications, construction details, and specifications of the new H-51 truck-mounted shovel-crane with Speed-o-Matic hydraulic controls. — LINK-BELT SPEEDER CORP., Cedar Rapids, Iowa.

B-36 GAS-FILLED CABLES — Booklet — Prepared for utilities personnel and engineers. Detailed technical information is contained on low pressure, medium pressure, and high pressure gas-filled cables, including a discussion on operation, application, and performance.—GENERAL ELECTRIC CO., Construction Materials Dept., Bridgeport 2, Conn.

B-37 DIESEL FUELS—Booklet, 45 pages —"Diesel Engines—Fuels and Lubricants" is prepared to give clear explanations of the functions, capabilities, and performance of specialized fuels, lubricants, and additives. —SINCLAIR REFINING COMPANY, 630 Fifth Ave., New York, N. Y.

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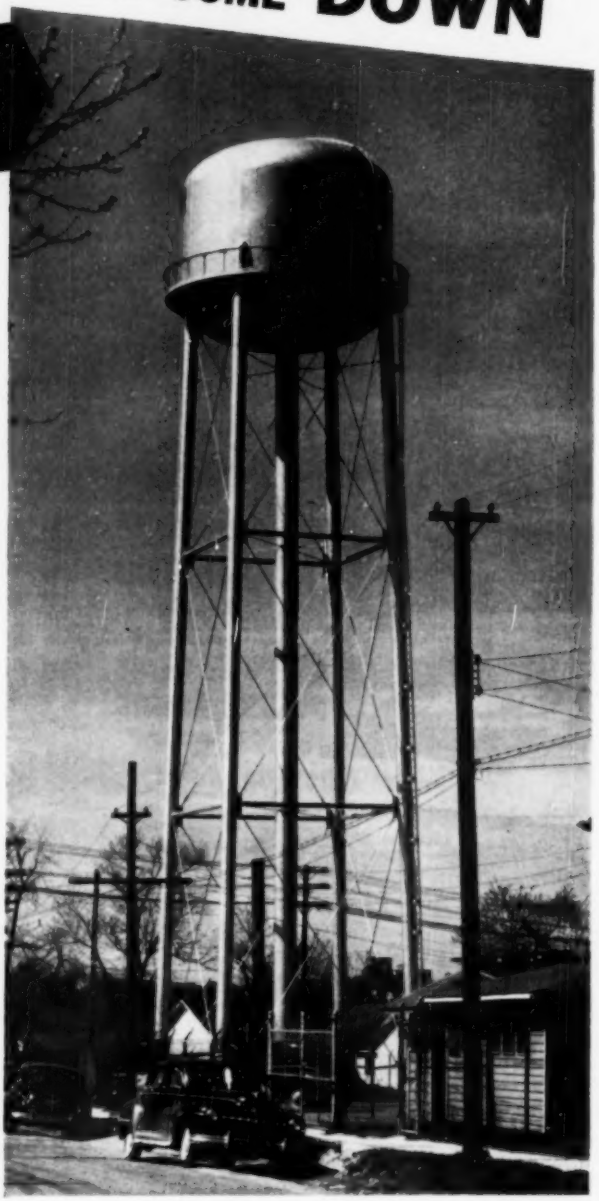

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